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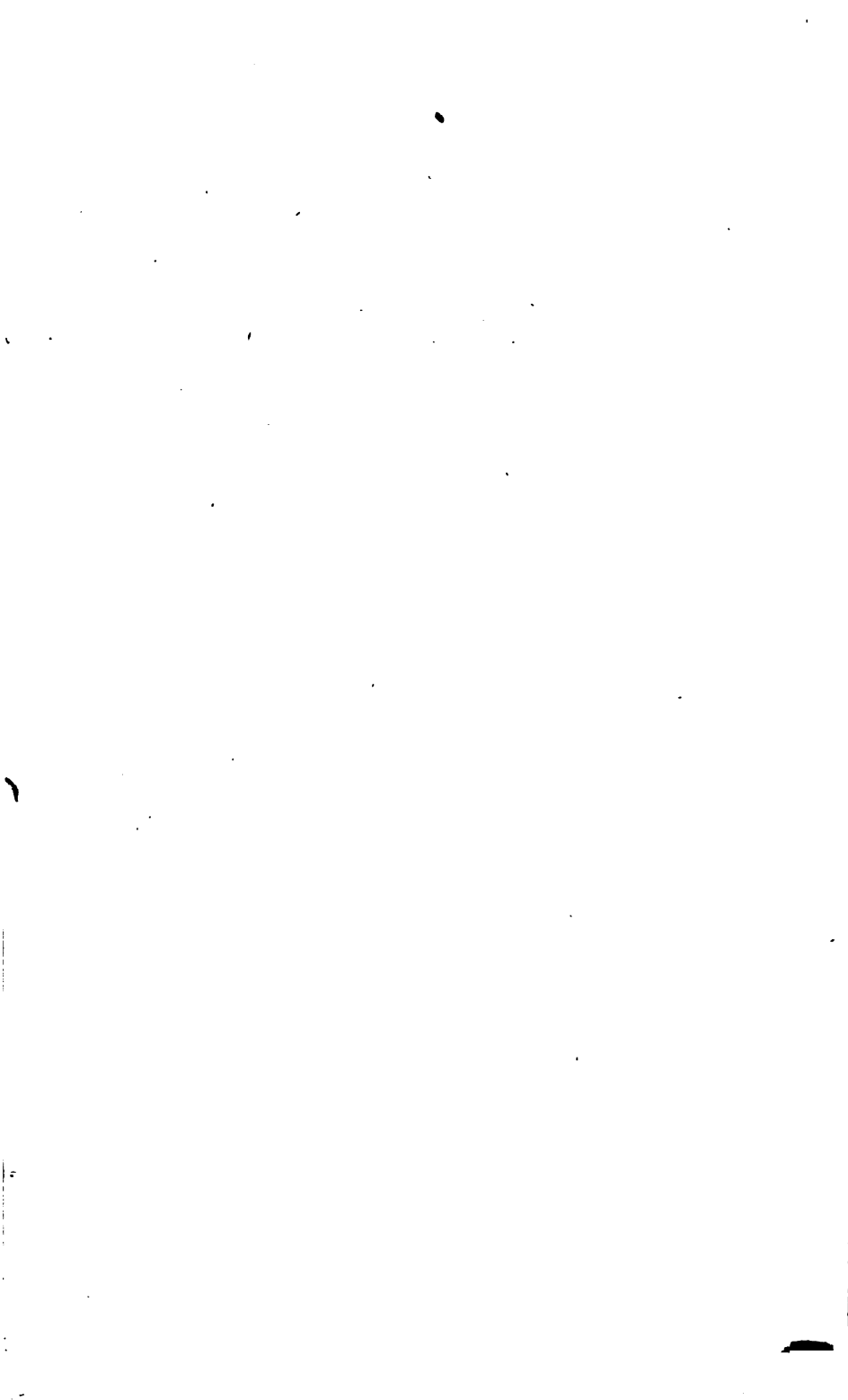
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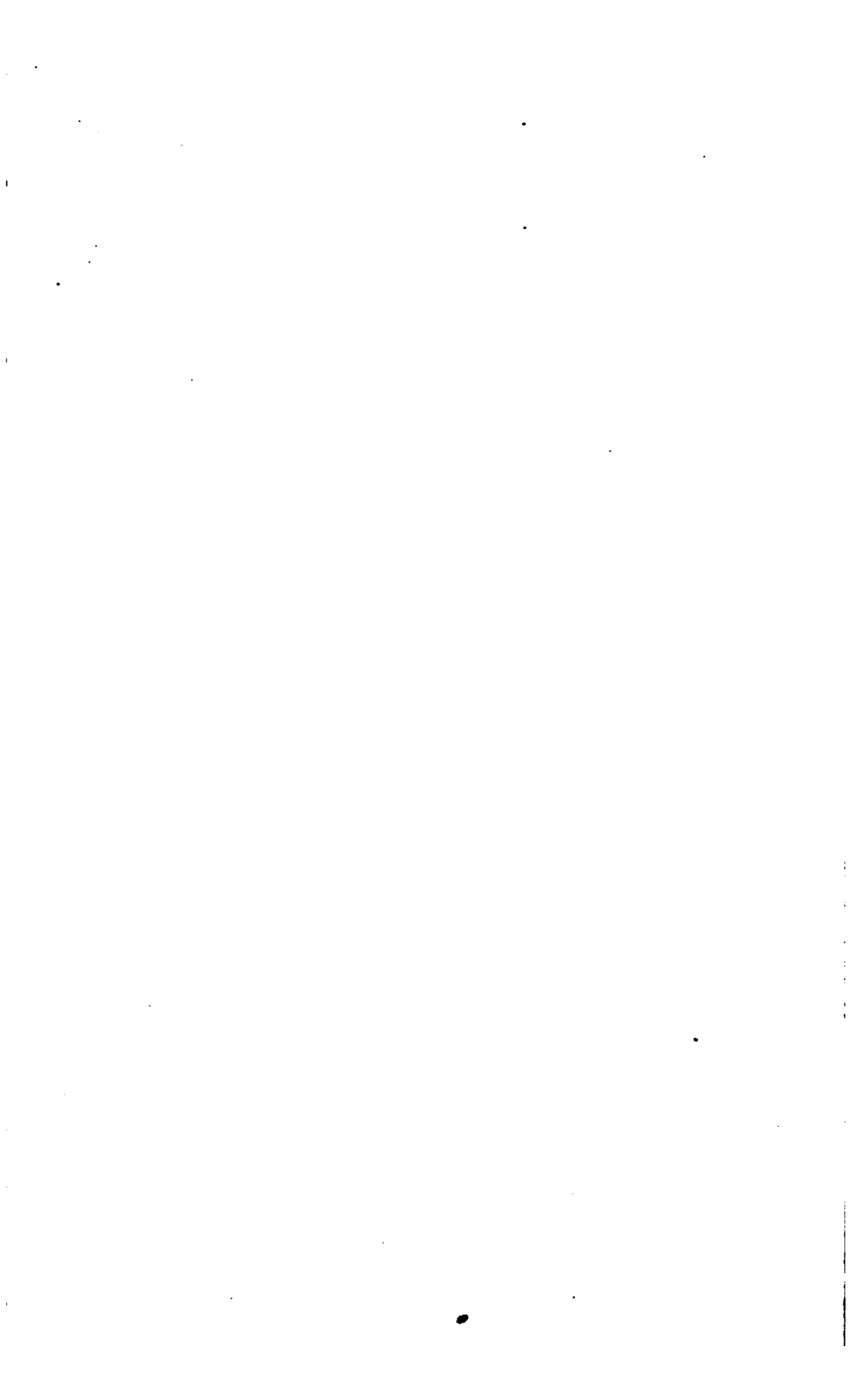
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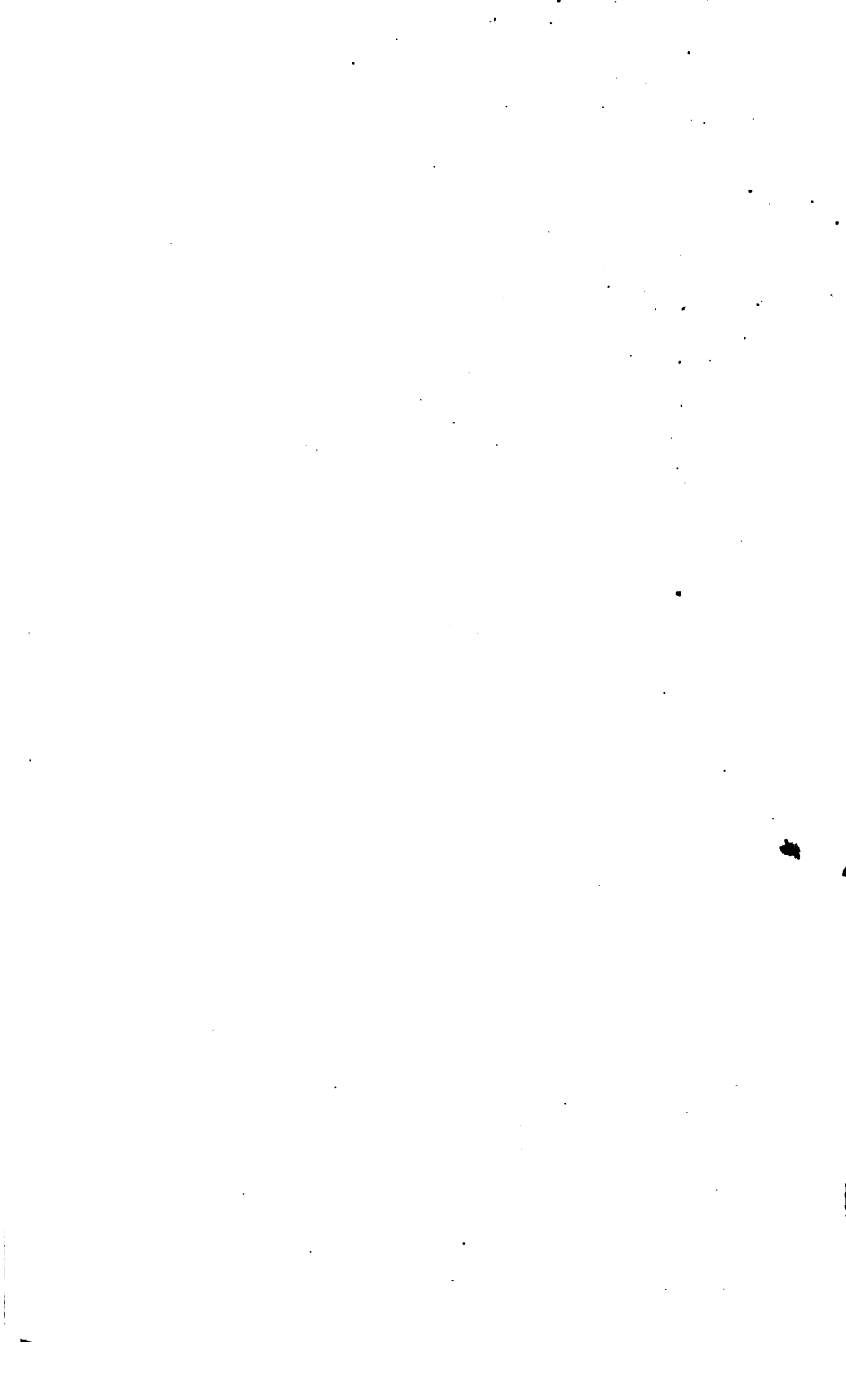
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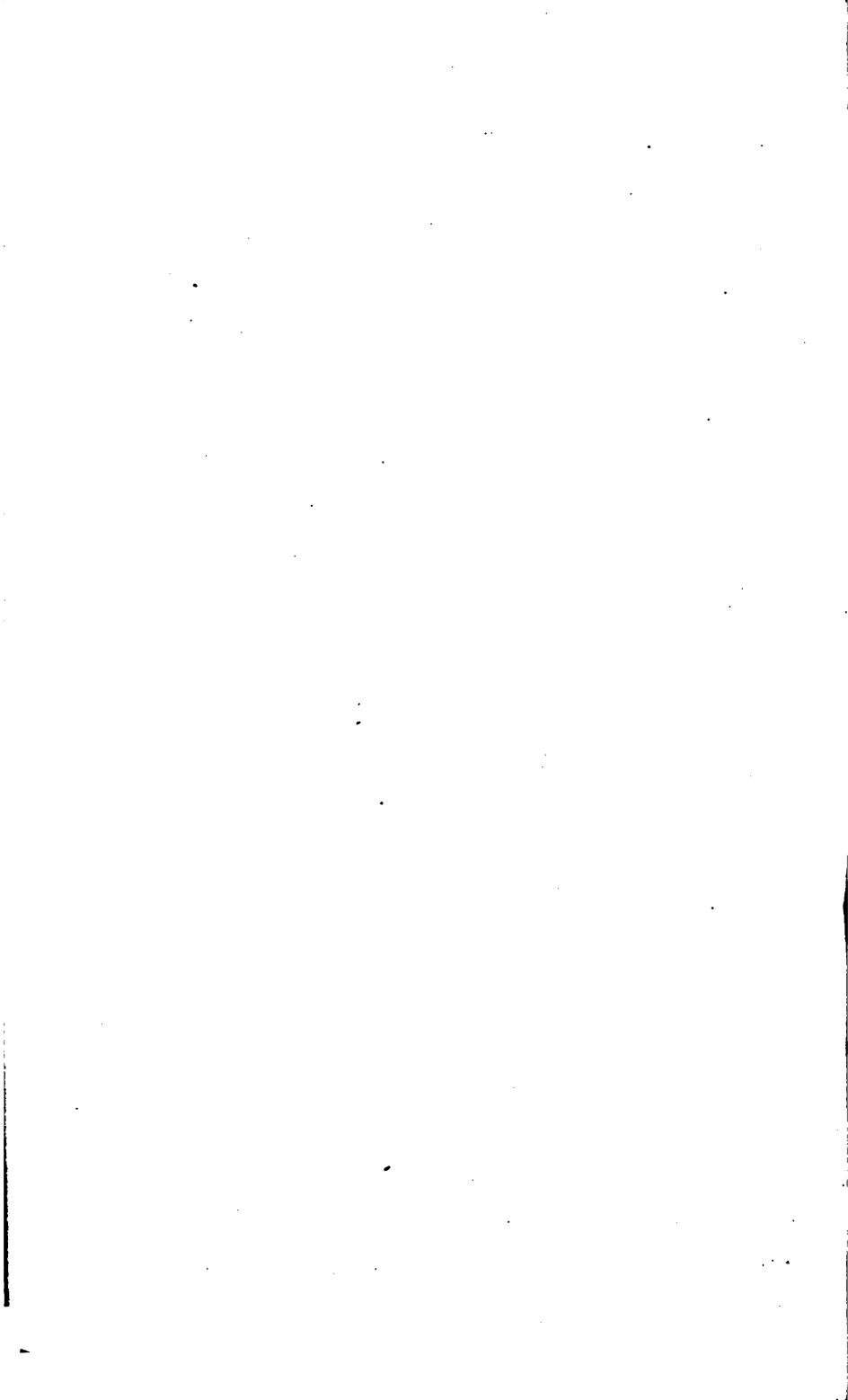








**THE**  
**HORTICULTURAL REGISTER.**



THE

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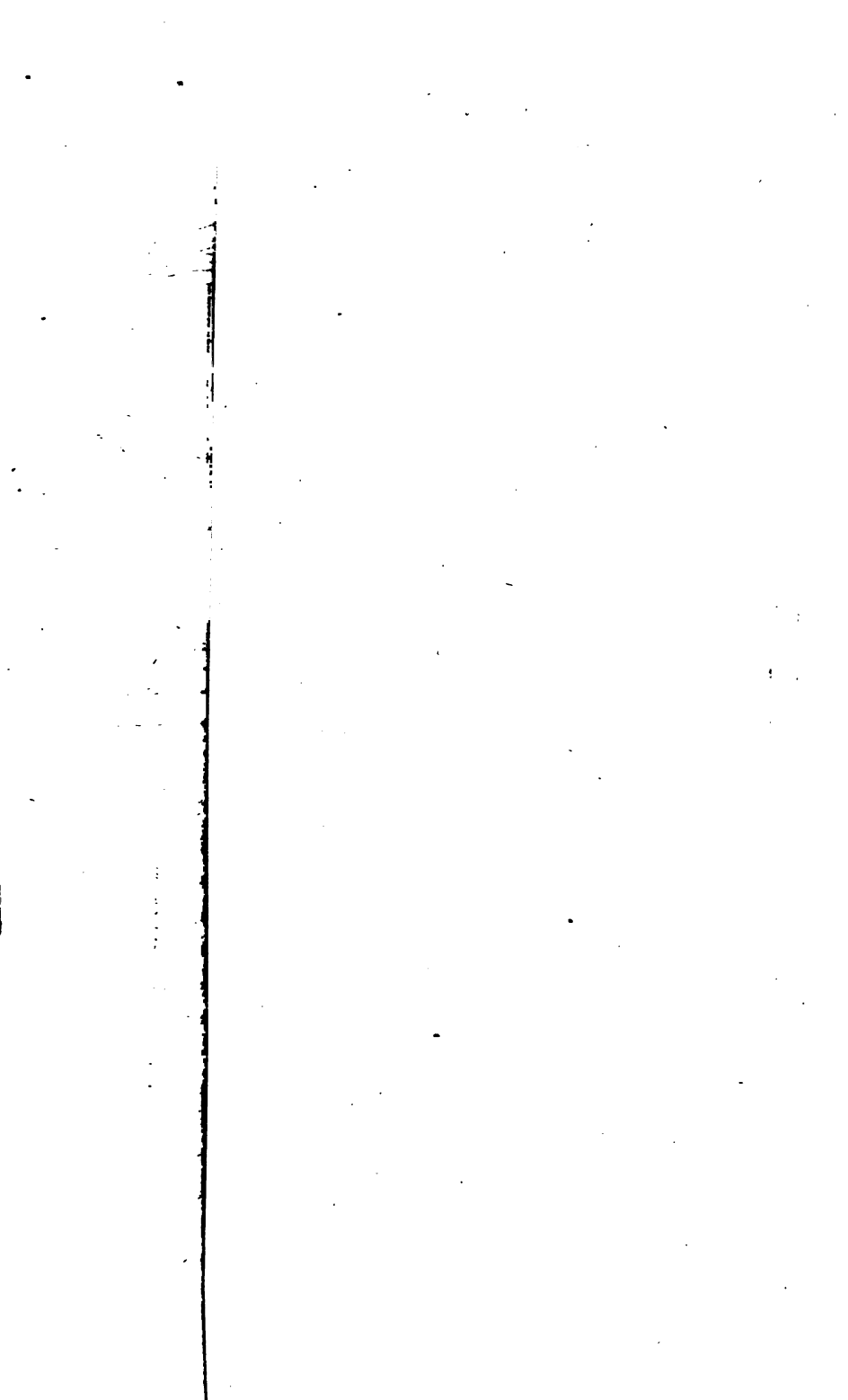
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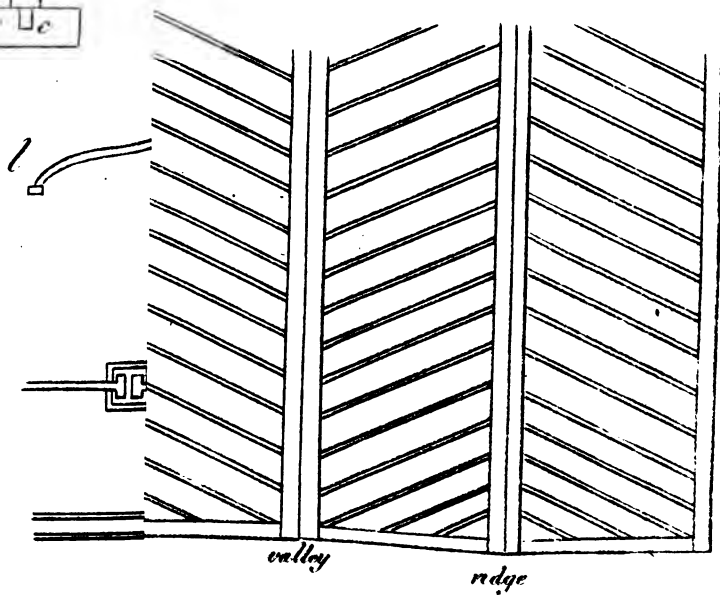
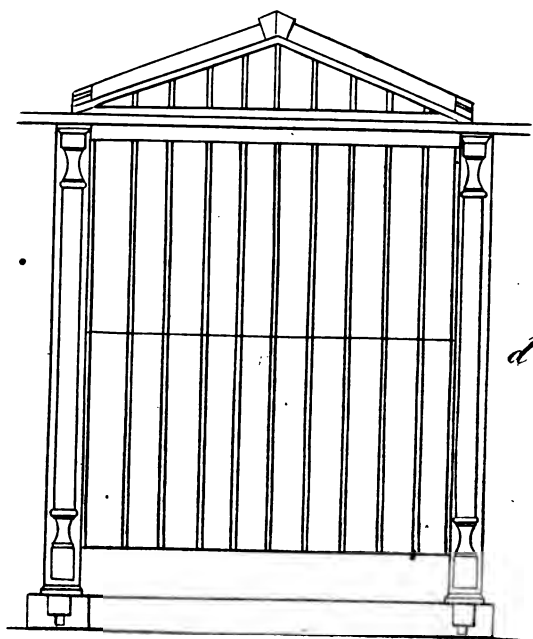
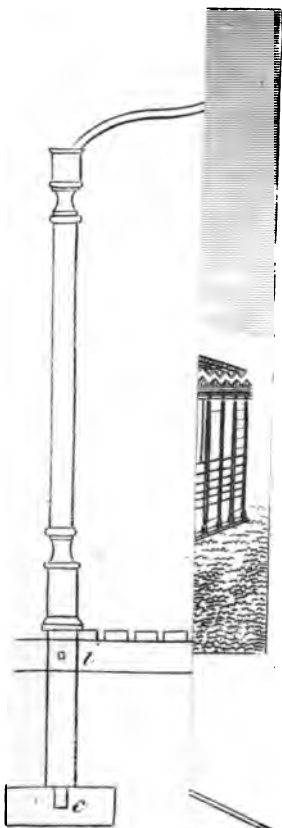
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# THE HORTICULTURAL REGISTER,

JANUARY 1ST, 1835.

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## ARTICLE I.—HORTICULTURE.

ON CHEMISTRY, AS CONNECTED WITH THE DEVELOPEMENT  
AND GROWTH OF PLANTS.

BY THE AUTHOR OF THE DOMESTIC GARDENER'S MANUAL.

(*Sixth Article.*)

My fifth paper (in No. 40) on the Chemistry of Nature, concludes the series, as refers to the operations of the natural agents.\* I am now arrived at a point at which chemistry, in the common acceptation of the term, may be called into action, and exert a legitimate sway over inanimate objects; for, wherever the vital principle prevails, there, I conceive, we are scarcely justified in attempting to ascribe the phenomena produced, to the work of chemical agency. The chief subject of this article will be to describe—

*The Analysis of Soils.*—The most comprehensive directions for effecting the important processes of analysis, are to be found in the last edition of Sir Humphrey Davy's Lectures upon Agricultural Chemistry. Drs. Thompson and Henry have written on the subject; but for common purposes, I consider a very simple process to be more suitable. No writer that I have met with, has entered into a refined, philosophical enquiry, on every point of the analysis; and, without great space, it would be impossible to go into minute detail. I prefer, therefore, to simplify the routine, but to elucidate, as far as may be, the chemical principles which refer to each individual process.

The varieties of soils are almost innumerable, but the constituents are very few. Divest a soil of vegetable and animal, decomposable

\* In that paper, I observe an error which requires correction. The word printed infringes —p. 419 last line, ought to be *impinges*, implying the action of light striking the earth's surface.

matters, and the pure earthy parts consist of sand or gravel (*siliceous substances*,) pure clay, (*alumina*) chalk, (*carbonate of lime*,) and iron, in the form of an oxide. These are the staple earths, and they all have metallic basis. Occasionally, small portions of magnesia, gypsum (*sulphate of lime*) oxide of manganese, and some saline products—as common salt, muriate of lime, and perhaps sulphate of potash,—are traceable by delicate analysis; but good loams, the very best, productive lands, do not require the presence of these compounds. The four primary earths named, are blended in varying proportions; hence, it is almost impossible for any one to ascertain that he can possess himself of a soil which has been recommended for the growth of different plants. The gardener is told, and reads of rich loams, hazel loams, sandy loams, light mellow earth, &c. &c.; but all these terms are indefinite; and no one can follow the directions thus candidly given, without being subject to disappointment, for the loams and earths, which a person may believe to correspond with those he reads of, are susceptible of changes as numerous as those that may be rung upon a peal of as many bells. Chemical analysis is the only source of correct information; and it is fortunate that a man who is of an enquiring turn of mind, and desirous to investigate causes, can, at a very trifling expense either of money or time, arrive at a certainty of conclusion,—which must be extremely satisfactory.

Let any one take up a spit of, what he judges to be, a good, sound loam; and then let him select about a saucer full from the middle part of the spit—say, four inches below the surface: this should be done in fine weather, when the ground is in rather a dry state. The soil so collected should be broken, or rubbed by the hands, till it be made as fine as possible; and, in this state, it is to be exposed in a open shed or room, to the influence of a current of air, where it may lose all the moisture that it can be deprived of, without the aid of fire or direct sunshine. Things being in this state, it will be proper to allude to the instruments which will be required for a sufficiently minute analysis; and I cannot do the subject greater justice, than to transcribe a paragraph which I find in Dr. Henry's *Epitome of Experimental Chemistry*—8vo. page 412, Edition 1808. I do this with the greater satisfaction, because the writer was an extremely clever Chemist, and had extracted the directions he gives, from an early work of the late S. H. Davy. Hence, the reader will be in possession of two eminent chemical authorities, and this must tend to inspire confidence.

The instruments are—"a balance capable of containing a quarter

of a pound of common soil, and of turning, when loaded with a grain; a series of weights from a quarter of a pound Troy, to a grain; a wire sieve, sufficiently coarse to admit a pepper-corn through its apertures; an argand lamp and stand; some glass bottles; Hessian crucibles; porcelain or Queen's ware evaporating basons; a Wedgewood pestle and mortar; some filters made of half a sheet of blotting paper, folded so as to contain a pint of liquid, and greased at the edges; a bone knife, and an apparatus for collecting and measuring æriform fluids. The chemical substances, or re-agents required for separating the constituent parts of the soil, are muriatic acid, (spirit of salt,) sulphuric acid, pure volatile alkali dissolved in water, solution of prussiate of potash, soap-lye, solution of carbonate of ammonia, of muriate of ammonia, solution of neutral carbonate of potash, and nitrate of ammonia.—The re-agents are sold, together with the instruments mentioned above, by Mr. Knight, Foster lane, Cheapside, arranged in an appropriate chest."

Most of the above articles may now be obtained, at a quarter of their former prices, of respectable chemists and druggists; but still, Mr. Knight, of Foster-lane, or his successors, keep every re-agent, and appropriate apparatus, and may be, at any time, referred to.

I shall arrange the processes under their respective heads—thus:

1st. *Drying*.—When this has been effected by the air, till the mass be reducible to powder, let an ounce weight be gently triturated in a mortar till the bulk will pass through the sieve; by this means the larger stones, bits of wood, or of vegetable matters, will be separated. If the first be found sufficiently hard to scratch glass, they may be considered siliceous or flint stones. If they effervesce when acid is poured on them, they are calcareous, or of the nature of chalk; but if they be soft, easily broken up, and do not evince any hissing, or disturbance in strong acids, they are of an aluminous or clayey nature. These stones and fibres ought to be weighed, in order to find what is their comparative proportion with any known weight of soil. Four hundred grains of the siftings, by accurate weight, are to be put in a saucer, with a small piece of shaving; and this vessel is then to be exposed to the heat of a gentle charcoal fire or lamp, (the contents being often stirred with a wire,) till the chip becomes slightly charred; at which period the drying must cease, otherwise the vegetable portions of the soil may be burnt; and in that case the chemical properties of the soil will be materially affected. It is calculated that the heat which will thus render a bit of shaving somewhat brown, is about 300 deg. of Farenheit. The soil thus dried, ought to be accurately weighed again, and its loss in weight will show the quan-

tity of water of absorption which it can retain. In fact, if soil so dried by actual fire heat, be long exposed to the air, it will absorb a corresponding degree of moisture again, though it remain dry to appearance. Davy, Mr. Johnson, and other writers, consider the absorbent powder of soils to be indicative of their composition if not of their comparative fertility. 50 parts out of 400, may be lost out of some soils—others lose but 20 or even 10 parts; and in these, sand is very predominant. I doubt the criterion much: having an example before me of a very fine loam which I find to be almost, altogether *fine silex*, and which loses  $5\frac{1}{2}$  per cent by a heat of about 300 deg. Coarse sand indeed is very little retentive, but siliceous earth is comparatively, very highly so.

2. *Process of Washing*.—Suppose that 20 parts of water have been separated from 400, by the heat of 300 degs—380 parts or grains, remain: let these be boiled in four ounces of rain water, and then, suffer the particles of soil to subside. When cold, decant the clear liquid; then add a little more water to the deposited matters,—stir them together, and pour the whole into a paper filter, which has been previously dried and weighed. Wash in all the dregs, and catch the drainings. If the liquid decanted off, be not quite bright, let it pass through the matters in the filter: *finally*, wash those, by adding a little more pure water. These waters of lixiviation contain all the salts, and other substances soluble in water; and they should be retained in a vessel for future experiment. The filter and its contents are to be dried,—first by absorption on a lump of chalk; then, by gradual exposure to a strong heat: to that at least, which the side of a parlour stove furnishes. The paper and its contents are then to be weighed; and the quantities of soil remaining, will be ascertained by subtracting the weight of the paper. Should the soil retain any degree of moisture, it must be dried in a saucer, or upon a broad plate of tin, and be then rebalanced.

3. *Process by Muriatic Acid*.—It will facilitate the description to place before the reader an imaginary analysis, which, however, will contain a close approximation to a real process. We will, therefore, presume that by drying and lixiviation, the original quantity of 400 grains has been reduced to 360 grains. These might be treated in bulk with the acid; but I propose to the analyst, to divide the soil into two equal parcels, each of 180 grains; because, as the object is to detect the carbonate of lime, it may, with advantage, be effected by a comparative experiment, which will prove very instructive.

*Muriatic Acid* dissolves carbonate of lime, (chalk,) Magnesia,

and Oxide of iron ; it also will take up alumine (clay,) but in very small quantity, unless a long continued heat be applied.

The muriatic acid of the shops if good, ought to be of 1180 or 1200 specific gravity—compared with distilled water of 1000—that is, supposing any given measure of pure distilled water to weigh one ounce, one pound, or any other unit ; good muriatic acid should in the same bulk, weigh one ounce, pound, &c, and about one-fifth more ; but this is too strong to operate with ; it therefore is to be diluted with twice its volume of rain water. A quantity of this diluted acid being ready, the two quantities of the soil, each of 180 grains, are to be disposed of : one in a four-ounce phial with a widish neck, the other in an evaporating basin, or in a florence oil flask. Place the phial in a scale, and by its side in the same scale, put another phial, or measure glass, containing 360 grains of the reduced muriatic acid, weigh the two bottles and their contents, with great precision ; note the weight, and let the bottles and weights remain in the scales. Prepare the same quantity of dilute acid for the other 180 grains of soil, and then proceed thus : pour some of this last parcel of acid into the basin or flask, stir or shake the contents, and observe whether much hissing, (effervescence,) with frothy bubbles be produced. If there be, the presence of much chalk is ascertained, and caution indicated, while operating with the substances in the scale. When it is found that the liquid will not be carried over the side of the vessel by the force of effervescence, all the acid of the second parcel may be added, and the mixture left to digest for two hours ; it should, however, be stirred two or three times with a strip of glass, or be shaken, if in a glass flask.

The required caution being pointed out, the phials in the scale are to be attended to. Into that containing the soil, drop very gradually, or pour in more freely (according to the indication of the process above described,) some of the diluted acid of the other phial. Agitate the contents after every addition, always observing that none of the mixture be forced out of the phial. This caution must ever be attended to in chemical experiments, and therefore, I am desirous to impress it upon the mind of a young experimenter : a little practice will soon bring on a habit of circumspection. The whole of the acid having been decanted from one phial into the other, and the contents being thoroughly mixed by the requisite agitations, the phials are to remain side by side in one scale, and the balancing weights in the other. Let the mixture be occasionally shaken till it be evident that no further bubbles or effervescence can be excited, and then let it stand till two hours have passed. Both parcels have

thus been acted upon by the same solvent, and for almost precisely the same time, but in different positions for determining results. The parcel in the basin or flask has lost as great a quantity of elastic fluid, as that in the phial, but neither the bulk nor the weight of that fluid (which is *Carbonic acid*) can be ascertained; whereas the parcel in the phial, provided the operator have been careful to maintain the same position of both phials and their balancing weights, is placed in a situation wherein the loss will be readily discovered. The two phials being now weighed again, will be found to have lost weight, and, therefore, small weights must be added to the scale with the phials, till it slightly preponderate; and then by counting the number of grains so added, the operator will detect, precisely, the quantity of elastic acid which has passed off.

The reader, will, I think, be at no loss to pursue the directions thus detailed, without let or perplexity, and may then turn to the consideration of the results.

Perhaps so little action has been induced in the *basin*, that it has scarcely been perceptible; and in the phial, there has been hardly any loss of weight. One parcel will have been a correcting check to the other, and so far the student have found a source of satisfaction, but another result, and one far more important, remains to be mentioned. In passing, I remark that this inaction, and scarcely sensible loss of weight, combine to prove that little calcareous matter has been in the soil; that point is settled. But I will let it pass, for it best suits my purpose to presume that several grains of elastic fluid have escaped.

*Lime* exists in soils in a state of *Carbonate*, that is, in union with carbonic acid; but its affinity for that acid, is less than for muriatic acid. When, therefore, the latter is placed in contact with it, the former is abandoned, and escapes in the state of gas, leaving the lime united with the stronger acid, in the form of a *liquid* muriate of lime.

In order to determine the quantity of carbonate of lime, the weight of the gas lost must be carefully examined: it is rather unfortunate that chemists differ in their calculations. Henry estimates the carbonic acid in every hundred parts, to be about 35 parts, others state it at 39; Davy says, "Carbonate of lime in all its states contains a determinate proportion of carbonic acid, i. e. nearly 43 per cent:—and for every  $4\frac{1}{2}$  grains of elastic gas loss, he estimates the carbonate of lime to be 10 grains. We will in this case suppose that, the experiment with the two phials, has produced a diminution in weight, of 6 grains; the quantity, therefore, of Carbonate of lime, in the 180 grains left after drying, &c. is about 15 grains. To correct this experiment

by comparison, recourse must be had to the other parcel of soil of 180 grains. The contents of the basin or flask, must be poured into an accurately weighted filter placed in a glass funnel, and the liquor or which percolates is to be caught in a glass vessel; the soil in the paper is to be washed repeatedly with pure water, till it drop free from acid flavoured, and the filter, after being laid for a time upon a lump of chalk, is to be dried and weighed as before: the loss of weight, when perfectly dry, will indicate the quantity of matters dissolved, but not that of the carbonate of lime only, because, the solution contains a certain portion of iron,—if not magnesia, &c. Another test, therefore, must be resorted to.

4. *Process by Prussiate, or ferro cyanate of Potash.*—Dissolve 20 grains of the salt in about half an ounce of water, weigh this solution, and drop it by degrees into that of the previous process. A copious precipitate of Prussian blue will be produced, and additions of the test are to be made till no more precipitate be formed. The process cannot be effected at once, because so much blue is often present, that the whole of the liquid is full of it, and time must be allowed to let it subside: try the clear fluid thus, till the falling drop of the test cease to yield any blue; then again pass the solution through a weighed filter, let it drop perfectly free from blue, and wash the precipitate till no saline taste be discernible. Reserve the blue for another operation.

Into the clear liquor drop strong solution of *Carbonate of Potash*: (this forms the 5th process,) and continue the addition till effervescence cease, and a white precipitate fall down. Solution of Carbonate of Potash is to be added to some excess, the acid will then be subdued, the chalk will be yielded, and the supernatant fluid will be muriate of potash, with a slight redundance of alkali. Prepare a filter, weigh it,—pour in the liquid and its sediment, and proceed as before; that is—in this and in *all other similar operations*, wash the precipitate with clear rain water, till no taste be perceived: then absorb the water left in it, placing the filter first on a piece of dry chalk, and then by applying heat. The weight of paper and its precipitate will now indicate the quantity of the latter, which ought to correspond, very closely with that determined by the previous calculation. Thus, if every process have been correctly conducted, there will be found about 15 grains of carbonate of lime upon the filtering paper, and this will agree with the estimate.

Magnesia, perhaps to the extent of a grain or two, may exist with the chalk in the filter. The mode of ascertaining the fact would be tedious, and my limits prevent the description of it here.

6. The *Prussian blue* in the other paper set aside, must be weighed with its paper, and, so must the portion remaining of the Prussiate of potash. Perhaps there are 8 grains of the former, but a part has been produced by the test which always contains some iron. If 8 grains of the dry Prussiate have been employed, allow about one fourth of its weight—or two grains, and 6 grains of, Prussian blue will remain. This latter substance is a prussiate of iron, and in order to detect the exact weight of the oxide of iron in it, fire must be employed to drive off the Prussic acid; but as great difficulty must attend this method of analysis, in consequence of the close adhesion of the blue to the paper, I propose that a small quantity of hot, caustic alkali—such as soap-lye, or pure potash in solution, be dropped into the filter till the blue color pass away, and the sediment become of a foxy brown: the prussic acid will be removed, and become united to the alkali; and then, [the paper being washed till no taste be present, the substance remaining will be oxide of iron, with perhaps a grain or two of alumine. The weight of the paper when dried, deducted from the gross weight will give that of the oxide of iron.

7. *Test by Sulphuric Acid.* The experimenter may either operate with the quantity of soil remaining after the abstraction of the iron from the parcel tested in the bason; or he may proceed first with that in the phial, and apply the prussiate of potash, and solution of Carbonate of potash, for the separation of the prussiate of iron and Carbonate of lime, as directed above. In either case, he will have the same materials to work upon; but there will, in the latter, be a double quantity of the two products, and a like addition to the weight of the remaining soil. The 180 grains of each parcel have been reduced to about 160 grains, and if we suppose one of these to be taken, it will be needful to boil it in a flask or basin, for two or three hours, with a diluted sulphuric acid prepared by cautiously adding 200 grains of the concentrated acid to 800 grains of pure water.

The substances remaining in the soil are usually the clay or alumine, a further dose of oxide of iron, and a large one of fine siliceous earth. The two former are soluble in sulphuric acid, the third is not so; consequently, after the due action of the acid the flinty matter or siliceous earth, is left alone without any other constituent.

After boiling, the vessel may remain till its contents become cool. Then recourse must be had to the filter for the separation of the clear liquid products; and the siliceous earth must be washed as before directed.

The iron is to be precipitated, either by prussiate of potash, or by succinate of ammonia; and lastly, the alumine by carbonate of pot-



ash. If succinate of ammonia be used, a brown succinate of iron will be yielded; the alumine will pass through the filter, as a solution of sulphate of alumina. Carbonate of potash will seize the sulphuric acid, from this, and throw down the liberated alumine, in the form of a light cloudy mass, of a dingy white colour. Let that be collected, dried and weighed: weigh also the siliceous earth remaining in the last paper filter, and the analysis by my simple process will be complete, as far at least, as refers to the four staple earths of the soil. Minutiæ must not be attended to, before the analyst become a practised chemist.

#### RECAPITULATION OF PROBABLE RESULTS.

	Grains.
Water of absorption driven off by heat, say .....	20
Do. of lixiviation which contains vegetable extract, muriates of soda, and lime say .....	20
Carbonate of lime from the muriatic acid in both parcels 15 by 2 .....	30
Iron from this acid in the form of Oxide .....	8
Siliceous matters of the two united parcels .....	276
Iron from the sulphuric acid .....	6
Alumine from do. ....	25
Loss by washing filter, &c. ....	15
<hr/>	
Total	400

When the student shall have acquired some dexterity in the performance of these simple experiments, he will perceive the necessity of deeper research: and to conclude with the words of the great Davy—he will gain general information by attempting original investigations. “In pursuing his experiments he will continually, be obliged to learn from books the history of the substances he is employing, or acting upon; and his theoretical ideas will be more valuable in being connected with practical operation, and acquired for the purpose of discovery.”

## ARTICLE II.

## ON CLEANING AND COLOURING OF GARDEN WALLS.

BY MR. J. MEARNS.

*Gardener to His Grace the Duke of Portland, Welbeck.*

WHEN I had the pleasure of a visit from you the other day, you were pleased with the clean and neat appearance of the garden walls at Welbeck; and requested I might send you an account of my method of performing it; I will be as brief with it as I can.

Take a quantity of Lime-stone, as it comes *fresh* from the kiln, according to the extent of walling desired to be washed over. Slack it with *cold* water; have ready some *finely* sifted, clean, sharp sand, and mix it with the finely slacked quick-lime, (in a large water tub, for the convenience of removal where required,) in the same proportion which is practised by builders in preparing a good cement for brick laying; add to it such a proportion of the best bright red ochre, or raddle, as, when dry, becomes a lively blush, or pink colour. This colour, when laid upon the walls, has a cold raw appearance; but if *double* the quantity of *best bright* Yellow Ochre be added to that of the red, it gives a tint that is warm, rich, and pleasing. Thin the mixture with cold water, till of the consistency of well prepared oil paint. It is applied to the walls with the usual white-wash brushes, and when put into the method, any expert labourers lay it on expeditiously and well. In using, stir it well up, so that the sand, &c. be kept suspended in the water, to be taken up in its required proportion, with the brushes.

When the trees are all unnailed, and the shoots and branches carefully tied into bundles, and drawn to stakes, from the walls, previous to laying on the mixture; it is of importance that all moss and lichens, &c. be scoured off from the face of the bricks, by rubbing them over with a free gritted stone, and water, or with an iron scraper taking out all bad bricks, replacing them with sound ones, and repairing all the bad joints, &c. In laying on the colour, it is of the greatest consequence that it be well worked into every chink, hole, and crevice in the face of the walls; for they are more effectually preserved from the frost and wet; and the hybernaculum of insects are the more effectually destroyed, and will well repay to be repeated every second or third year.

The unsightly appearance of garden walls; generally, is a continual eye-sore to every lover of neatness and good order; for, however, neat and orderly a garden may be kept in other respects, if the walls which inclose it cannot lend its aid in embellishing the whole, it has but a dismal prospect to the discriminating eye. The belief that those most unsightly *black* walls will accelerate the maturation of fruits, lying close to them is incorrect; for, although, upon nice chemical experiments, it would appear to do so, yet, in practice it has certainly failed to demonstrate the fact; for the fruits both upon white and red walls are as forward as those upon the black; and I believe that fruit ripened upon light surfaces are, generally, better coloured, and higher flavoured than those from the black; and, even if it were the case, that some little was gained by the blush, it cannot be an adequate recompense for so unsightly an object. The lightsome appearance of the Walls at Welbeck is cheerful, and neat; and as well as upon the fruit trees trained on them, will soon shew a most invigorating influence upon the border crops; especially in spring and autumn.

The job is not yet a perfect one until the brick joints are drawn, so as to deceive the eye of pretty good judges, that it is a neat faced brick wall; and which work, boys are soon taught to perform expeditiously and well.

The preparation for drawing the joints is the same as for the wash, only rejecting the Ochres, and adding some finely sifted scoria from the iron Foundries, or Smith's forge, if the lime be too white, which gives them rather too artificial an appearance; but that may depend upon fancy or choice, as it will add but little to durability. In applying, keep it well stirred up, as in the wash; and take it up into garden *bottom* pans, for the convenience of application.

The best tools I have found for facilitating the work, in drawing the joints, are painters' ordinary sized sash-tools, tied flat, by two *fine* slips of wood laid on opposite sides of the bristles, as near to the handles as they can be placed, and only tying the two extreme ends of them tight together with pieces of strong thread; they will not slip off. As the sand, &c. will frequently fur up the brushes, and prevent them taking up the colour freely, have some water at hand to wash them *briskly* and occasionally, or they will not work free and expeditious.

No straight edge is required, as the work is only impeded by the use of it, where the masons have run the joints with their jointing racer.

JOHN MEARN'S.

P. S. One coiled rootless branch of the Purple Constantia Vine, introduced the 30th of March last, has produced 35 bunches of well

matured Grapes ; many of the bunches were as fine as I ever saw any upon a Purple Constantia, I have just commenced forcing some of those which I coiled last season, and I expect fine crops from them.

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### ARTICLE III.

#### ON GROWING PINE APPLES WITHOUT POTS.

BY MR. W. BROWN, JUN.

THE practice of turning the Pine Plants out of the Pots into the bark bed ; is well worth the notice of the horticulturist, being, in my judgment, preferable in some points to the method of growing them in pots. I observe it has been practised by Mr. Mitchinson, with the best success.

In properly erected pits, the Pine, if well managed, will perform its functions satisfactorily in all seasons of the year ; on the other hand, though the care be never so great, and the treatment never so good, if the pits or houses are not well constructed, the fruit will neither be fine nor good.

Light, air, and a good supply of heat, are requisites indispensable to the well-being of pines ; and although too much light at certain seasons of the year is injurious, yet at those times the plants may be readily shaded, whereas, if the houses are dark, nothing will supply the want of light.

In reference to planting pine plants in the bark bed, their spongiollets are at perfect liberty either to rise towards the surface, or run in any other direction, where they can obtain the most nutriment. I will now state an experiment made with a *green plant*, it was not a fine or strong one, it had not shewn fruit, and was one year and a half old, I turned it out into the bark bed, the latter end of last March, (1834), it grew a little, and then began to shew fruit, apparently like the others of the same kind ; but I observed that it was a longer period in flowering and ripening its fruit, than those in pots, I think a full month later, and made a much better fruit than any of them. I think this is worthy of notice, for it frequently occurs that the greater part of the best plants, show fruit too early occasionally even some months.

We are not at a loss for means to push them into fruit at a certain time, but there is more difficulty in successfully keeping them back until a certain time ; for the former, Griffin recommends giving them only one-half the supply of water, for the latter—placing the plants

rather close together in the pit, and allowing their roots to run out of a pot, and as Dr. Lindley remarks, "a high temperature, with great atmospheric humidity are all causes of excessive vigour, and therefore unfavourable to flower buds." By keeping the house warm and damp it is obvious the fruiting season will be retarded, providing the plants are well supplied with water, and shaded a few hours in the middle of the day from the powerful rays of the sun."

In all gardens where pines are grown, some particular kinds are favourites whether those are Providences, Envills, Antiguas, Globes or Queens. Supposing half a dozen or more of the Providence or other sorts which have become fine plants, and there is ground for fear, will fruit too soon, I would recommend turning them out into the bark bed, at the time of renewing the pits and increasing the heat; it will not matter whether this be in the winter or summer months. Plant them in the middle of the pit, forming with them the centre rows, which will allow the convenience of lining with bark, both at the back and front of them without having cause to remove them, if it should occur that they did not fruit till the following year.

In planting them, place two inches thickness of broken potsherds for the ball to rest upon, and then with rich fine mould taken from the top spit of a pasture, well mixed with rotten pig manure, and potsherds broken to the size of field beans, place round the ball to thickness of four inches more or less, judging from the quantity of fibres belonging the plant.

The broken potsherds being mixed with the soil, tend to dry up or carry off the superfluous moisture, which otherwise might be injurious to the tender roots. Take away as many of the lower leaves, as the plant will allow without injury, place the compost close round the ball and stem, and cover the whole with a little new bark. The roots will run freely in the compost, and the plants may be expected to be much finer, and the fruit larger. The green, when shewing ten or twelve eyes deep, may be grown to weigh six pounds or more.

*Coleorton, October 20th, 1834.*

## ARTICLE IV.—ON CANKER IN PEACH AND NECTARINE TREES.

BY MR. WM. GREY.

THE management of Peach trees having been ably treated in the *Register*, I should not have attempted to advance any thing on the subject, had I not seen a few remarks by Mr. Eaton, p. 457; and as the opinions of practical men differ, I hope I may be allowed to give my opinion without disparagement to those advanced.

I have had the charge of extensive Peach walls in the gardens at Beaufront, near Hexham, where there is 160 yards of flued wall, covered with peaches and nectarines, and during the six years that I was gardener at that place, I never covered one tree, as a small fire kept in the flues, was always sufficient to protect the blossoms from injury, and I never failed having a full crop of as fine fruit as any in Northumberland. And were I to judge from my own experience, no degree of cold in spring is ever able to produce the canker in Peach Trees.

A handsome trained tree is both a credit to the gardener and an ornament to a garden, but I have seen great outrages committed in training by bending the branches to put them in straight lines; by thus pressing and laying the trees to the walls the bark is broken, and, when the sap begins to flow in spring, it meets with a stagnation where the bark is injured, the gum flows out, and that part generally cankers and dies off; because the rains and moisture constantly find their way into the wounded part.

Every gardener knows that if a Peach tree, by any accident, becomes bruised either with the hammer when nailing, or any other way, *that* part is sure to become cankered, and I verily believe that the canker is brought on trees more by twisting and bending their branches, to please the eye, than in any other way; no person is more particular than myself to have handsome well regulated trees, but none more carefully guard against distressing the bark, by twisting or straining the branches. I have peach trees under the management of what are called *old fashioned* gardeners, where no respect has been paid to neat training, but their trees were healthy, quite free from canker, and produced very good fruit.

The method of training I practice and prefer is fan-shaped; if I could find time at that busy season the end of February or beginning of March, I would never prune any of my trees till that time, as all wounds heal much sooner and better at that season when the sap is flowing, than at any other. Trees that are pruned in Autumn and winter, are liable to decay in consequence of the wet lodging

in the wounds, so that they never heal so well as spring pruning.

A peach border with a dry bottom, and properly prepared, with good turfy soil will never canker trees, disease is brought on more by bad treatment, than any other way. I have seen borders prepared with heavy adhesion soil, such as cleanings of ponds, &c. which had never been turned at intervals and exposed to the effects of frost, the effect was, the peach Trees were much infested with mildew, and other maladies.

For fruitfulness and health much depends on a proper selection of wood, shoots that push out from old wood of three or four years old is seldom fruitful, and if much wood of this kind be retained in a tree, the fruitful branches will be injured, by the luxuriancy of the others, and in some cases literally starved to death. The most fruitful wood is that from the last year's growth, and it is always necessary to select such for leading ones as are stronger than the subordinate ones.

There are several kinds of wood in Peach trees, namely *false* wood from branches of three or four years old,—the second is that of a subordinate branch where it grows very succulent, and stronger than the leading branch,—the third is a spur pushing out wood,—the fourth is a spur,—the fifth is a shoot that has not been properly nourished, and the blossom buds are not perfect,—and the sixth sort is the leading branches of different years' growth, whence all these other woods issue, and through which they receive their nourishment.

I have long thought great improvement might be made both to the health and duration of Peach trees, were Nurserymen to desire gardeners to save all the peach stones, and sow them for stocks, on which to work peaches and nectarines, I believe they would be found to answer better than plum stocks, being more porous, and by working them on their own natural stocks, the bole and upper part of the stock would swell in equal thickness. I have often looked with disgust on trained standard peach trees, the upper part of the tree is double the thickness of the lower or plum stock, and whenever I see them it brings to my mind, poor fellows who, by misfortunes, are obliged to walk with wooden legs.

Nurserymen may probably condemn me for saying the root of the plum is more tenacious than seedling peaches—I can state from observation, having had two peach trees under my management that were worked on natural stocks, when they were twenty years old, they were as vigorous and healthy, as any trees I ever saw.

P. S. I have a great number of Vines coiled in pots for the ensuing season, I will report my success through the *Register*.

## ARTICLE V.

## CULTURE OF MANGOES AND OTHER TROPICAL FRUITS.

BY MR. R. FORBES,

*Gardener to the Right Honourable Lord Powis, Walcot.*

THE soil I use for Mangoes, &c. is good loam from a rich old pasture, well prepared by frequent turnings and mixed as follows:—Two barrowsful of loam, one barrow of well rotted vegetable leaf soil, from three to four years old, three parts of a barrow of pure river sand, and three parts of a barrow of sheep dung well decomposed. This soil is not sifted, but beat and broken and well mixed until it has become pretty fine.

The Mangoes at Walcot are not planted out, but are grown in pots and tubs, we give them no bottom heat, nor do I think it would be in any wise beneficial to them, except under circumstances, when plants are sickly, and you wish to increase their roots.

Mangoes, when well established and in a fit state for bearing, ought to be kept in a house by themselves, as I find by experience, that they do not require so much heat in winter as most other tropical plants. I recommend to keep them from November to the second week in February in a temperature of from 50 to 55 degrees by fire heat, and not higher than 60 degrees by the influence of the sun, otherwise they are liable to break out into flower too soon, before our long dark nights are past, which will prevent the fruit setting and doing well. When in flower, air ought to be admitted freely, and the thermometer kept as steadily as possible from 60 to 65 degrees by fire heat, and 70 to 75 degrees in sunshine.

*November 15th, 1834.*

## ARTICLE VI.

## PLAN AND DESCRIPTION OF SOME PINE AND MELON PITS,

*Erected at Byrome, near Ferry Bridge, Yorkshire.*

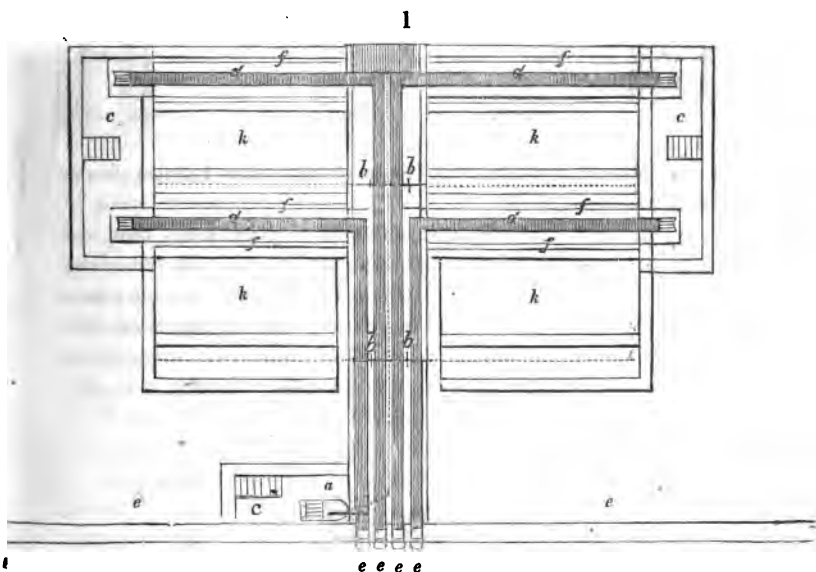
COMMUNICATED BY MR. J. TINKER.

INCLOSED is a rough sketch of my pine and melon pits, they answer well for either purposes, I used to heat them with dung linings, which caused endless of labour and dirt, besides sometimes injuring one or two of my back rows of plants owing to heat. You are well aware, I have no doubt, that a little lively heat applied to the bark bed causes it to heat violently in a short time, particularly a dung



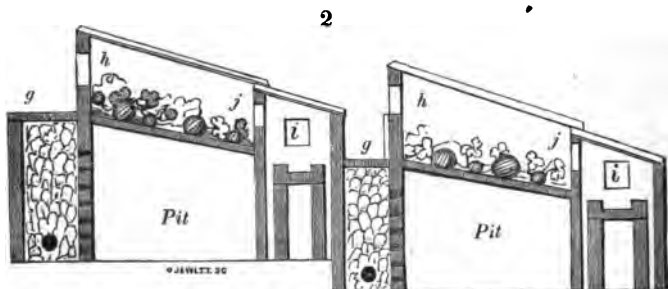
lining, but by steam I have perfect command of the heat. I can turn it off and on at pleasure; by dung we have not that command, but it is useless giving you a long account. I know you well understand the merits and demerits of a dung lining, suffice it to say that steam is more at command, and of less trouble, and the flags that cover the rubble makes a nice foot path, and gives a degree of neatness that is very pleasing.

I have not drawn to a scale, but you will readily understand it. Our fire holes are sunk quite out of sight, and the flues are carried underground to a wall, and the pits sunk so much as to prevent any unsightly appearance. The front pits are sunk fourteen inches below the back ones, to prevent shading;—the front flues are covered with dished covers, and water is poured in at the ends which flows all the length.



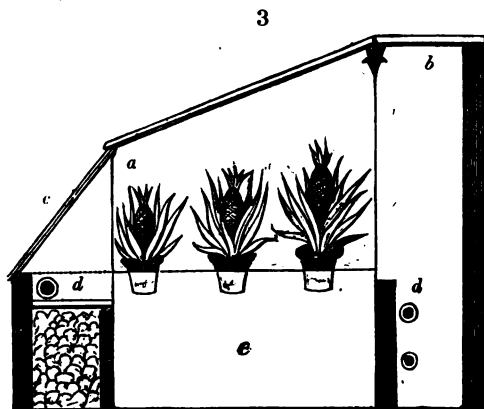
One boiler with stop taps and pipes on this principle would throw sufficient heat into twenty bark beds. My pipes run on the top of the flues, and drop at the back of each pit; (a) is the boiler. The dotted lines on the ground plan show where the steam pipes are laid—they are one inch bore, and are perforated to allow the steam to escape into the pit, when necessary. (b) stop cocks. (c) fire holes sunk below the surface, and descended into by a flight of steps. (d), smoke flues. (e) chimnies to the smoke flues. (f) cavities or air flues. (g) paths filled up with rubble. (h) doors to admit air. (i)

little doors through which to pour water on the top of the flues. (*j*) gratings to admit heated air to the plants when requisite. (*k*) back wall of the garden on which the chimnies are erected. The walk at the back of each pit is one foot six inches wide; the inside pit in which the plants are grown, is of the back pit seven feet six inches broad, and the height of the back wall seven feet six inches, and of the front seven feet high at the back wall, and seven feet broad across the pit, and each are forty feet long.



I have also a pit heated with hot water pipes that I fruit pines in, which I like very much.

It is built at a light expense, it is forty five feet long, there are flags placed over the head at the top; a hot water pipe runs along the front as well as back, and both descend into the low pipe at the far end from the boiler, and return under the top pipe at the back



path; the sloping part (*e*) over the front pipe is glass; (*a, a, a*) are three quarter round iron rods; (*b*) flags overhead at back; (*d*) front and back pipes; (*e*) pit 8 feet wide.

I have also a little cucumber pit lately built, into which I have taken a branch steam pipe. It is on Mc. Phail's plan with a hole in the pipe to let out steam into each flue; also holes under the hills which are put upon rubble, and by turning on the steamer every two or three days, it causes a very nice heat. I have a trellis to train my plants upon, or rather to spread them upon, about twelve inches from the glass, they look very healthy, and likely to do well through the winter.

*Oct. 23rd. 1834.*

## FLORICULTURE.

### ARTICLE VII.—REMARKS ON THE ERECTION AND GENERAL MANAGEMENT OF GREENHOUSES,

WITH THE PLAN AND DESCRIPTION OF A NEW ONE BUILT AT CHATSWORTH.

BY JOSEPH PAXTON, F. L. S. H. S.

ALL greenhouse plants being natives of temperate climates, as the Cape of Good Hope, New Holland, &c. require very little artificial heat, and *that* only under certain circumstances.

In building a greenhouse, always place it so as to receive the full benefit of the morning and mid-day sun. This is particularly necessary for the welfare of the plants during winter, and early in the spring.

Light is indispensable, therefore, so construct the building, that as little light is obstructed as possible. Also the back and front sashes, or ventilators, should be fixed to open with ease, for the admission of as large a quantity of air, as will be required at different times in the year.

With regard to the materials of which the roof ought to be constructed, we would always give preference to wood, except in certain forms of structure, when metal may be used with advantage.

The mode of glazing may depend in some measure on the taste of the proprietor, or those into whose hands he commits the care of the building. In no case, however, should the laps of the glass be put-tied, because the circulation of the air, is thereby greatly impeded. If beauty is an object, the glass on the roof should be cut in squares of about six inches by seven inches, but for cheapness and strength six by three inches is preferable: and if the laps be small, and the workmanship be done judiciously, the glazing will look very well.

Our new greenhouse at Chatsworth is so constructed, that scarcely any more light is obstructed than in a metal roofed house, but it possesses at the same time all the advantages of wood.

Its whole length is ninety-seven and a half feet, and its breadth from the back wall (*a*) to the front lights (*b*) twenty-six feet.\* The roof is supported by two rows of cast iron pillars, one row along the centre of the house (*c*), and another along the front and end as (*d*). These pillars are placed six feet and a half apart in the rows, and are each three inches diameter; the front ones are made hollow so as to admit a leaden pipe, which carries off the water from the roof, into a drain laid in the gravel walk, on the outside of the house; this entirely does away with the appearance of a spout. At the bottom of the iron pillars there are sockets (*e*) which let into the stone, and thus give the pillars firmness, and through this socket the pipe descends into the drain.

The elevation at the back wall is thirteen feet six inches, at the lowest part, and fifteen feet at the highest part or ridge of the angle; the height in front is eight feet six inches in the valley, and ten feet to the ridge of the angle. The lights of the roof (*g*) are made fast, and fixed on the angle fashion, each light is twenty-five feet, six inches long. All the front and end lights slide in a double groove (*h*), so that although there is no door, yet a person may enter in at any part of the house.

The centre row of pillars (*c*) are two feet six inches longer than the front or end pillars; about two feet from the bottom of each, a small hole (*i*) is left, through which a screw passes, to fasten the bearer which supports the centre walk (*j*), on the top of these pillars is also fixed another iron support (*k*) which is formed to rise up to the ridge of each angle; each of these arched supports, have at their ends a small square part (*l*) which fixes into a hollow left at the top of each pillar (*m*), and after being properly adjusted they are fastened by running a little matted lead into the interstices.

In each valley of the angles two large screws are inserted into the styles of the lights, to fasten them firm. Air is admitted by sliding the front sashes, and by ventilators in the back wall (*o*), which are made to swing on pivots, and open by means of long iron rods, having holes to fix on pins driven in the wall, so as to regulate the proportion of air at pleasure (*p*.) To prevent these ventilators from being unsightly, a square piece of trellis work is placed over the opening inside of the house, as may be seen in the perspective view.

The house is heated by four fires; the flue covers are dished for

\* See Copper Plate Engraving.

the advantage of steaming. The two end flues run under the front walk, and meeting in the middle of the house, cross and discharge themselves at the two chimnies in the centre of the back wall, and the two centre fires pass under the centre walk, and discharge themselves at the two end chimnies.

The walks are three feet six inches wide, and are composed of bars of wood four inches broad and an inch and a half thick, nailed half an inch apart upon strong bearers.

The price for erection stands about as follows:—Deal wood, taking an average, including the scantling, &c. &c., will scarcely exceed 2½d. per foot; sawing the same 4s. per hundred feet; workmanship 2½d. per foot; Glass six inches by three for the roof 6d. per foot; Glazing 1½d. per foot; pillars 10s. per cwt.; front foundations, and the entire fitting up, as flues, &c. &c. entirely depend on local situation and other circumstances. And now for a few remarks on the management of greenhouse plants.

Greenhouse Plants should never be supplied with much water in wet or frosty weather, and none unless the soil in the pots becomes dry. This rule must be particularly attended to, from the beginning of November till the end of February.

In March, the plants may be occasionally syringed overhead to clear and refresh the leaves, but always select fine days for the purpose; and let this, as well as the general waterings, be done in the morning, from the middle of September till the beginning of May, and at all other times in the evenings.

As the season advances, and the weather becomes milder, increase the quantity of air, until, by the middle of May, a large portion of air may be left on all night, except in case of severe frost. And this rule of admitting air must be attended to throughout the winter at every convenient opportunity: but always make a practice of shutting up early in the afternoon.

Always keep the plants clean, and perfectly free from dead leaves and weeds; this must be particularly attended to in the winter season.

About the beginning of March replot all the plants that require it, and top-dress the remainder with good fresh soil. Some free-growing kinds may require potting two or three times in the course of the summer, but the last potting should never be later than the middle of September.

As Greenhouse Plants differ materially from each other in habits, so also the soil suitable for them must vary in proportion. For a general idea on the subject, the following, (noticed Vol. 1, p. 499,)

with some few exceptions, will probably be found pretty near the mark.

All plants whose branches are fragile, and roots of a fine thready fibrous texture, with general habits like *Erica*, as *Diosma*, *Andersonia*, *Epacris*, &c. will require the same soil (peat earth) and very similar treatment to Cape Heaths.

Those whose wood and general habits partially differ, and whose roots are of a stronger texture, as *Acacia*, *Ardisia*, *Stenocarpus*, &c., will require a portion of sandy loam,—in many cases about equal parts; and where the habits, &c. differ materially from the heath, only a small portion of peat earth will be required, and the compost may be made a little rich, by the addition of well rotted dung.

Almost all Cape and other bulbs, as *Sparaxis*, &c., thrive best in a mixture of light rich sandy loam, leaf mould, and a little peat. Shrubby and herbaceous plants, with luxuriant roots and branches, as *Myrtus*, &c., require rich loam, lightened with leaf mould. Plants with powerful roots and but slender heads as *Veronica* *Senecio*, &c., require a light sandy soil, mixed with a small portion of leaf mould and very rotten dung.

Never pot the plants in a soil too wet; it is better to keep the soil rather dry than otherwise. Nor ever sift the soil, but chop and break it as fine as possible, because sifting deprives it of the fibrous particles, amongst which the roots grow very rapidly. Always in potting give a good drainage with broken potsherds.

In the beginning of June the plants may be removed to their summer station, out of doors. Always place them in an aspect screened from the effects of the mid-day sun, but yet where they will be able to receive the sun morning and evening: whilst in this situation they must be supplied with water as often as they require it.

In the beginning of September again examine them throughout, and pot all that require it, and top-dress the remainder: by no means let this be done later than the middle of September, or the plants will not have time to recover before winter.

Not later than the first week in October, prepare to remove them back into the greenhouse. Clean and properly tie them up, previous to setting them on the stage.

After they are removed again to the house, give them abundance of air, day and night, and continue gradually to decrease it as the weather becomes colder.

*Propagation.*—The propagation of greenhouse plants must be performed at different times of the year, according to the nature and habits of the plants, and the state of growth in which the cuttings will strike with the greatest freedom.

Some grow the best when the wood is quite young and tender as *Fuchsia*, *Andersonia*, *Adenandra*, &c., others when it begins to assume a brownish colour, called half ripened as *Heliotrophium*, *Goodenia*, *Pimelea*, &c., and others when it has become quite hard and ripe as *Araucaria*, *Aulax*, *Melaleuca*, &c. But as a general rule half-ripened cuttings will do the best. Some plants however will not grow from cuttings of the stem at all, these are propagated by cutting off large pieces of the roots, planting them in pots of soil, and plunging them in a little bottom heat, as some species of *Acacia*, &c.

All hard-wooded plants make roots best in clear sand, but soft-wooded kind should be planted in a mixture of loam. Therefore after well draining the pots or pans, intended to receive the cuttings, fill them, according to the nature of the plants to be propagated. On no account plant soft-wooded and hard-wooded cuttings in the same pot.

Some sorts will not grow readily without a little bottom heat. Plunge the pots in a cucumber frame, or pit of any kind, where they will receive the benefit of warmth.

After putting in the cuttings, give them a gentle sprinkling of water through a fine rose: keep the frame as closely shut down as can be until the cuttings are struck, which will be in about three weeks or a month, with some few exceptions. Look them over, and water as often as they require it.

Those sorts, requiring to be covered with bell, or hand glasses, will require to have the glasses taken off occasionally, and wiped, to prevent the cuttings from being injured by damp.

When the cuttings have struck root and begin to grow, then pot them in small pots filled with soil suitable to their nature; replace them for awhile in the frame, and gradually expose them to the air, until they bear the temperature and treatment of the other plants in the greenhouse.

Sow the seeds of greenhouse plants in pans, or pots, filled with a light soil, as early in the spring as possible; place the pots in a very gentle heat, keep the soil damp by covering with moss, and occasionally sprinkling with water; and when they are about an inch high, pot them off into small sized pots, and treat them in the same manner as cuttings.

## ARTICLE VIII.—NEW AND RARE PLANTS,

FIGURED IN THE PERIODICALS.

## CLASS I.—PLANTS WITH TWO COTYLEDONES, (DYCOTYLEDONES.)

## LEGUMINOSÆ.

*LALAGE ornata*, Gay flowering Lalage. —A native of the south-west coast of New Holland, where its seeds were collected by Mr. Baxter. This is one of the prettiest of the New Holland leguminous plants. Its leaves are of a deep rich green, and the colour of the flowers is a pleasing mixture of yellow, orange, purple, and crimson. It requires to be kept in a well-aired greenhouse, and may be multiplied by cuttings.—*Bot. Reg. for Dec. 1722*.

*GENISTA amxantica*, Amsantan Genista.—This species is quite hardy, and from its trailing habit, and copious clusters of golden flowers, is well suited to ornament rock-work, where it will be found to thrive luxuriantly. It was discovered by Professor Gussone, on hills in the valley of Amsanto, not far from Frigento, in the Kingdom of Naples, a spot famous for its mineral springs, and for the unhealthiness of its air, arising from sulphureous exhalations. It may be increased, either by seeds or layers.—*Brit. Fl. Gard. 266*.

## COMPOSITÆ.

*EUPATORIUM glandulosum*, Glandular Eupatorium.—An herbaceous plant, a native of Mexico, whence seeds were received by the Horticultural Society some years since, through the favour of the late Mr. Canning. It was found by Humboldt and Bonpland upon the high table-land of Mexico, between Carpio, and Gasave, at between 7 and 8000 feet of elevation. It will thrive in a pit screened from wet, and severe winter's cold, and is increased easily by cuttings.—*Bot. Reg. 1723*.

*GALARDIA bicolor drummondii*, Drummond's Two-coloured Galardia.—This very pretty Galardia was raised in the Glasgow Botanic Garden, from seeds gathered by Mr. Drummond, at Rio Bragosa in Texas, in the autumn of 1833.—*Bot. Mag. 3368*. The flowers are deep carmine with a bright yellow border.

*GALARDA picta*, Painted Galardia.—This species was gathered in Louisiana, by Mr. Thomas Drummond, and from seeds transmitted by that enterprising collector; the plant has been raised in various gardens. It should be planted in a mixture of peat and loam, and may be increased either by cuttings or seeds, which it perfects in the open air. It is probable that the plant will prove little more than



biennial, and, therefore, that by seeds will be the most satisfactory mode of multiplying the species.—*Brit. Fl. Gard.* 167.

## POLEMONIACEÆ.

*LEPTOSIPHON densiflorus*, Thick-flowered Slender-tube.—In its general appearance before flowering, this is very like the *L. androsaceus* (noticed Hort. Reg. p. 467;) its corolla, however, is three times the size of *androsaceus*, its colours vary in the same manner from purple to blue and white. It flowers in October and November, if sown in the Spring; and in April and May, if sown in the Autumn; but would hardly survive a severe winter. Its seeds are produced in very small quantities, so that, being an annual, it is likely to remain for some years a very rare plant.—*Bot. Reg.* 1725.

## CACTEÆ.

*OPUNTIA monocantha*, One-spined Opuntia.—This species is said to be a native of the hotter parts of South America.—*Bot. Reg.* 1726.

## SOLANEÆ.

*NIREMBERGIA calycina*, Large-flowered Nierembergia.—This species was discovered by Mr. Tweedie on the Uruguay River, and who sent seeds to our gardens, and dried specimens to our collections. From the former, plants were raised in the Glasgow Botanic Garden, where they flowered in a warm situation in the greenhouse.—*Ibid.*

*NIEREMBERGIA atkinsiana*, Mr. Atkin's clove scented Nierembergia.—This hybrid was raised by Mr. Atkin's Nurseryman, Northampton, between *N. phœnicea* (violacea) and *N. nyctaginiflora*. In habit it is much like the former, but the flowers are nearly intermediate between those of the two parents. The plant will prove a great ornament in the flower border, as it blossoms most abundantly, and is as hardy as the *nyctaginiflora*. It is readily increased by cuttings. The flowers, especially in the evening, diffuse an agreeable fragrance, resembling that of the clove pink.—*Brit. Fl. Gar.* 268.

CLASS 2.—PLANTS WITH ONE COTYLEDONE, (MONOCOTYLEDONES.)

## HÆMODORACEÆ.

*ANIGOZANTHOS manglesii*.—This singularly beautiful species of *Anigozanthos* was raised in the garden at Whitmore Lodge, Berkshire, the seat of Robt. Mangles, Esq. from seeds brought from Swan River by Sir James Stirling, the enterprising governor of that colony, by whom they had been presented to Mr. Mangles. It thrives well if planted out in a border composed of equal parts of maiden loam, leaf mould, and bog earth, with a slight mixture of pounded chalk; a cold frame will be a sufficient protection in winter. It is easily propagated by offsets.—*Brit. Fl. Gard.* 265.

## REVIEWS.

## ARTICLE IX.—THE FRUIT CULTIVATOR,

Being a Practical and Accurate Description of all the most esteemed Species and Varieties of Fruit, cultivated in the Gardens and Orchards of Britain.

BY JOHN ROGERS,

Nurseryman.—12mo.—384 Pages.—6s.—London, 1834.

THIS excellent little work contains the description of nearly five hundred species and varieties of Orchard and Garden fruits; nearly all of which have been propagated and cultivated by the writer himself, or under his immediate inspection. He has, during a long life of varied and active employment, made and kept notes of the results of his practice; and which he now in his eighty-third year, lays before the public.

This book differs from many others which have preceded it, chiefly in this, that whereas former works only give general directions as regards the management of different species, this enters into minute details, not only respecting the species, but of every variety and subvariety which the author has found to be worth cultivation; and nothing is advanced which he cannot vouch for truth. He has employed the plainest language, as he disapproves of the use of botanical or scientific terms in the descriptions of fruit, or of any matter relative to the culture. And we can safely recommend it to the use of every young gardener in particular, and to experienced gardeners in general, who will find in it some very useful and instructive hints—We quote as follows:—

*"Of the Soil most Suitable for Apple Trees.*—The successful culture of the apple depends very much on the suitableness of the ground they are planted in. The size and flavour of the fruit, the general health and duration of trees, is most commonly the result of good or bad soil. Climate and situation also effect both trees and fruit; but not in the degree in which the same are affected by the qualities predominant in the land. Of all the different descriptions of soil to be met with in these kingdoms, that of a soft hazel loam, containing a small portion of sand, seems to be the most congenial to the apple generally. In such soil the tree is seen to flourish longest, is most productive, and remains freest from disease or attack of insects. A great depth is not requisite; eighteen or twenty inches being quite enough, provided it be on a dry subsoil of chalk or loose rock. If the bottom be wet, the trees should be planted high, and every means taken to drain the ground. A wet bottom of gravelly clay should be

avoided if possible: no kind of apple thriving long if the roots once enter into such a cold substratum.

Deep rich soils in sheltered situations are not the most proper for the apple, though such have been most erroneously recommended by writers who ought to have known better. For it is often seen that apple trees succeeded well in any kind of loam, though it be not more than one foot in depth, so as the bottom is sound and dry, the roots take an extensive horizontal range, the young wood is always of more moderate growth, and better ripened than where roots strike deep into the ground.

Although local circumstances often control the wishes of the planter, compelling him to fix on a site where the soil may not be exactly like what is recommended above; he must, in this case, endeavour to make the soil by trenching, draining, and by addition of the qualities wanting, bring it as near to the standard as possible.

*Situation and Aspect for planting Apple Trees.*—The situation of an orchard should neither be in the bottom of a narrow valley, nor on the top of a hill: in the first, the bearing wood is never so well ripened, the buds are often too early excited in the spring, and there, frosts are always more intensely felt; in the second, fruit-bearing trees are always too much exposed to winds. The most desirable site is the side of a hill which slopes gently to the south, or south-east. If higher ground or a belt of forest trees bound it on the north, it is an advantage, as yielding shelter, often necessary to break the cutting winds of March and April. A western aspect is not to be preferred, because of the violent gales often experienced from that quarter; more especially during the months of March, when the buds are swelling, and in September, when many of the trees are loaded with fruit. If, however, a western slope be the only choice (other circumstances of soil, &c., being favourable,) the planter has only to take care that the fruit trees be protected by screens of forest trees on the exposed points. This may be done, in a great measure, by the fruit trees themselves, that is, by planting the hardiest kinds, and tallest growers, on the north or windward sides, and placing the more delicate and lower growers towards the south.

*Forcing Apple Trees in Pots.*—The Juneating is an eligible sort for growing in pots; and the best manner of treating the trees is as follows:—Provide neat little maiden plants on paradise stocks, and pots for each twelve inches wide at top and ten in depth. Prepare some good compost, like that used for melons; that is, fresh hazel-loam with plenty of decomposed old hot-bed or other dung. Drain the pots well; and, when potted, plunge them in the ground in a

sheltered situation, covering the surface over the pots with an inch or two of exhausted mulchy dung, to keep the roots safe from the changes of the weather. Here they may remain twelve months. In the second spring (supposing them to be potted in the early part of the first year), when the buds begin to swell, they should be pruned, reducing weak shoots to half their length, and strong shoots one-third. After they begin to grow, the trees will require due supplies of water; and as the roots are in a sort of prison, the water given them should be rich. To make this manured water, mix it with one-third of its quantity of the brown drainage from dunghills, or what may be found in farmyards; or, if such cannot be had, collect a bushel or two of horse-droppings, which put in a large tub, together with a handful or two of soot, fill up with water, and stir it frequently. In the course of a few hours it may be given to the pots once or twice in the week. It should not be allowed to become stale; the fresher it is the better. This liquid the author has found more nutritive to potted trees than any thing else, and therefore can safely recommend it for every kind of fruit grown in pots.

About Michaelmas following, the mulch should be removed; the pots taken up, and replunged; taking care not to injure the surface roots, for these are of the greatest service to the plants. In the following spring little pruning will be necessary, only shortening some of the strongest shoots. In the course of the summer, flower-buds will be formed; and when this takes place, the trees are, at the proper season, fit to be taken into the cherry-house, or some such similar place, where they can have abundance of moisture and *moderate heat* (say from 56 to 65 deg. of Fahrenheit;) for neither apples, plums, nor cherries, can bear violent forcing or dry heat.

If such potted trees have been housed and borne fruit, it is well to remove them to the open air as soon after as possible; not put away, as is too often the case with such things, in any bye corner, but properly plunged, mulched, and regularly watered, to recover their vigour, and ripen their buds for the next year. It is hardly necessary to add, that, where a succession of forced apples are required, a sufficient stock of potted plants must be kept for the purpose; as a few such fruit plucked from the trees a month or two before they ripen naturally, are always regarded as a delicacy.

*Blight on Apple Trees.*—There is as much care and attention required in keeping fruit trees in health, and free from attacks of insects and parasitical plants, as there is in propagating and transplanting them. Constitutional diseases should always be distinguished from the depredations of insects. Of these in their order; viz.

*Canker*.—This seems to be a constitutional disease, and to arise from a defect in the organization, occasioned by impure qualities taken in by the root from an ungenial subsoil. This is a conclusion come to from experience; because, in low, damp situations, where the subsoil is strong gravelly clay, there the trees are mostly cankered; while the same kinds planted on a light loam, having a dry bottom of rock or chalk, remain perfectly free from the disease. We cannot exactly say how this happens, or describe what the deleterious qualities are, which derange and destroy the healthy bark and wood of a tree; but, knowing what is stated as the cause to be a fact, all we can do to prevent it is, to avoid placing trees in situations where they would be liable and exposed to the disease; or if our land be of that unfavourable kind, endeavour to improve it by draining, or by any means that will prevent the root from sinking into the noxious subsoil.

*Insects*.—Are the *American aphid* or *coccus*, otherwise called by naturalists the woolly or frothy aphid. This is too well known to need further description. To kill those that are visible, and stop their young from infecting the whole tree, a wash must be made of soft soap and warm soft water, worked together till of the consistence of thin paint. This must be laid on the stem and branches with painters' brushes of various sizes, and pressed into every chink or opening of the bark where the insects hide and breed. The action of the brush crushes the old ones to death, and the clammy nature of the wash prevents all movement of either old or young. One application will not be enough to extirpate them, because many of the young are safe and lie hidden under blisters of the bark, which, unless first pared off with a knife, neither brush nor wash can reach. But if this wash be applied hot, and as often as the insects appear, a tree, or any number of trees, may be freed from them in time. Other remedies have been suggested, as inferior vinegar, strong soap suds, lime water, infusions of tobacco, &c. But whatever application may be used, taking the insect in time, that is at the moment it first appears, will be found the most effectual, and a great saving of time. As this plague is related to the cochineal insect, its blood is almost as strong a dye, and will discolour the linen of the workmen if allowed to fall thereon.

*Aphis, or common Green Fly*. This is one of the most numerous and common insects, found on many different plants as well as fruit trees; but on the apple least of all. On plums, cherries, &c., they are often hurtful, as well in checking the growth, as in soiling the leaves and fruit with honey-dew which they exude. These insects are easily killed or banished by fumigations of tobacco smoke, wherever it can be applied.

**Caterpillars.**—Of these there are many different kinds which prey either on the buds, the leaves, flowers, or fruit of the apple tree. They are mostly the larva of moths, the eggs of which are laid in the crevices of the bark or round the buds in the autumn or spring, and on the approach of warm weather are hatched, eat their way into the buds, and often devour both leaves and flowers. Sometimes the whole of the foliage is destroyed by the caterpillars of a very small moth (*Tinea patella*,) which come forth in such myriads as to eat every leaf off whitethorn hedges, as well as those of the apple in sheltered places. There is no way of keeping trees free from these winged insects, unless we could wash or sprinkle the whole tree in the autumn with some liquid that would be offensive to them. Famigating the orchard with heaps of burning haulm, or straw sprinkled with sulphur, in the autumn, is said to taint the trees, and drive away the parent insects from nestling thereon. So effectual is this expedient deemed in Normandy, that it is never omitted by the orchardists there.

**Parasite Plants.**—Such plants as live upon others are called parasites. Of those affecting apple trees, are the rust, mildew, misletoe, lichen, moss, &c. The three last are got rid of by any cutting or scraping tool. Sometimes to prevent moss or lichens fixing themselves on trees, they are smeared with a wash of hot lime and water; and which is no doubt serviceable, as well for the purpose for which it is applied, as for preventing insects depositing their eggs on the bark. Rust and mildew are both funguses, which are easily killed by strong soap-suds repeatedly applied to the parts affected, or by sprinkling, when wet, with flour of brimstone alone, or mixed with soap suds. These remedies must be applied in the garden when necessary; but it is seldom they can be conveniently employed in the orchard. The author has found soot, or rather the effluvia of it, to be very offensive to many insects, by only strewing it on the ground under the trees.

**Gathering and Preserving Fruit.**—All summer fruit should be gathered in the cool of the morning. They are then more juicy, and higher flavoured. If gathered in the heat of the day, they are vapid, and not half so refreshing to the palate as when gathered before the sun has much power.

Fruit baskets should be made of any light material, chip or wicker-work, either round or square, with cross handles; and with rims about  $2\frac{1}{2}$  inches deep. There should be one for each kind of fruit, and covered within with vine leaves to receive them singly, as gathered. This refers to all fruit which are gathered from the tree on the day they are to be used; such as early apples, pears, plums,

peaches, &c. Some kinds show when they are ripe by the colour and transparency; some by their scent, but most of them by the ease with which they quit their hold of the tree. Handling them to judge of their ripeness is a bad custom; because the least pressure of the thumb and fingers is sure to injure both the appearance and quality. Almost all kinds ripen unequally: the firstlings must be picked as they are ready; but if they quit the tree spontaneously as soon as ripe, the whole should be gathered together a day or two previous, and laid singly on thin layers of clean straw, dry fern, or moss, on the shelves of the fruit room. Early kitchen apples may be laid in small heaps, and lightly covered to exclude the air, in which state they will keep longer than if lying exposed.

The shelves for fruit should be made of some scentless wood: white poplar, beech, or wainscot oak is best. Deal is apt to impart a resinous scent. A fruit room should be a cool place, and capable of being kept free from the changes of weather; an equal temperature is of the last importance for the keeping of fruit; and for which purpose the windows should be fitted up with well-made shutters.

Before the winter fruit are laid on the shelves, each sort should be carefully gathered when dry, and laid in separate heaps on the floor of the room, and closely covered up for eight or ten days, not longer.

After this time they should be each wiped with a clean cloth, laid on the shelves upon straw singly, and covered with a thin layer of the same.

All fruit intended for keeping, should be gathered *just before*, rather than after they are ripe; this does not prevent their perfect ripening, and prolongs the period of their keeping.

There are several other modes of keeping fruit which may be mentioned: viz. first, in jars, or in any other air-tight vessel, embedded in sand. For this manner of packing fruit, the finest sand should be procured, and thoroughly dried in an oven; a layer of sand is first put in the bottom, on which a layer of fruit (the eye towards the side) is placed and covered with sand; next a layer of fruit, and so on alternately till the jar is full. The fruit are so disposed, that no two touch each other: and when the jar is filled and shaken down, it is plugged or bunged up, covered with wax, and tied over with bladder, or white leather, on which the name of the fruit is written. The jars are stowed away in a dry cellar; and in this way apples and pears have been preserved good for twelve months.

Pitting apples, like potatoes, has lately been practised, and succeeds very well. It is a German custom: and when there is no other convenience for storing the fruit, it may be had recourse to. Choose

a perfectly dry spot of ground, dig out a trench five feet wide, of any required length; and one foot deep from the natural level of the ground. After the sides are sloped, cover both them and the bottom with turf, the grass side outwards, on which the fruit are laid, two and a half feet thick, but highest like a ridge along the middle. The apples are then covered closely up with turves, the grass next the fruit: and over all must be laid a covering of dry earth one foot thick. All the best keeping apples may be preserved in this way till the months of March and April; but it should be observed, that they remain sound but for a very short time after being taken from the pit. Protecting the fruit from the action of the air and changes of weather, is alone necessary to prevent their decomposition.

There is another very simple way of keeping apples sound, as practised by the author. In a day or two after gathering, let each apple be wiped perfectly dry, wrapped in thin white paper, and packed in a box or basket, with straw at bottom, sides, and on the top. Thus packed, they are placed in a dry, airy room, where they keep extremely well. Apples may be kept by art much longer than pears; but these last may be preserved for a month or two over their time by jar-packing, and placing them deep in the ground.

*Formation of Fruit Borders.*—In the first place it should be understood, that if the garden has a good staple of fresh loamy soil of the depth of eighteen inches, on a dry subsoil of hard pure gravel or rock, no extra making or preparing the border is necessary, except trenching, and laying it in proper form. No border should be made deeper than one foot and a half. In excavating the bottom there is danger lest it become a reservoir for water, which without such a piece of ditching would not be attracted there at all. If the subsoil be any kind of clay or earth retentive of water, it is not well to disturb it, unless any water lodging in the excavation can be speedily drained away. On such a substratum, it is better to raise the border to the requisite depth by a proper soil brought on, than to sink the bottom. If the bottom be naturally wet, either from its quality or situation, it should be effectually drained; and some pains should be taken to prevent the roots being invited into it. This is not easily done unless the whole bottom be closely paved; no other material will prevent the descent of the roots, if invited by nutritive matter or by humidity. Sufficient drainage, and the top soil made and kept as much like that recommended for melons as possible, will go far to keep the roots from running away from the place intended for them.

When the borders are made, levelled, and all ready for the trees, the aspects and distances between should be well considered. Many



mistakes are made in planting too thickly ; better it is to have two supernumeries between two principals (the former to be cut away as the latter advance) than have a fine thriving principal to remove, just, perhaps, as it has got to a state of full bearing. The spaces required by each kind of tree, being added to each description in the previous and following parts of this treatise, will be a safe guide for the planter in disposing his trees at proper distances. Another thing which the author particularly recommends is, shallow planting: nothing is more hurtful to fruit trees than deep planting, inducing canker and many other disorders. Allowance must be made for the sinking of the border ; and better it is that additional earth be required to cover the roots higher, than that they be sunk too low.

With respect to the different modes of training, the author has only to remark, that he approves of the horizontal fashion for pears, cherries, and the stronger growing kinds of plums ; the fan method for all the more delicate kinds of wall fruit, peaches, &c. ; and the upright mode for vines and figs. But though these different fruit trees are trained in the ways above mentioned, in most well-kept gardens, the rule is not arbitrary ; because a clever pruner and trainer can put any tree in almost any shape or order he pleases.

*On Pruning the Nut Tree.*—It may be matter of wonder, but so it happens, that the generality of gardeners know little or nothing about pruning filbert trees. The art has never been studied either by masters or men ; and it is remarkable, that this branch of the pruner's art should have been brought to perfection by the untaught, unlettered Kentish peasant—without books—without master, save experience—without mistress, save Nature herself ! It is curious too, that this art has been engrossed by the labourers in the central parts of the county, and without its being followed in other parts of the kingdom. The knowledge seems to have descended from father to son for generations, and a very useful portion of rustic knowledge it is. Here the author begs to observe, how much more valuable is the knowledge which has been gained by the mere dint of practical experience, compared with that emanating from theoretical writers, who bury what they really know of practical matters beneath a load of hard names and learned quotations, which only serve to puzzle rather than inform the reader. So much of this kind of writing is now extant, that, though read over and over again, and even committed to memory, the reader would not be so wise during his whole life (especially as respects the pruning of the filbert) as a visit to Maidstone would make him in one hour.

The principle of the Maidstone pruners appears to be thus : to

check and control the natural growth, and thereby bring forth the fruit-bearing principle in greater force and energy. After training the tree to a dwarfed habit, they allow it to expend its strength in no other way than in the production of flowers and fruit. The filbert is naturally only a shrub, or small tree, and the cultivator makes it still less for his convenience, in pruning and gathering the fruit. That style of pruning, which is found the best for the currant, is also the best for the filbert.

The young plants which are chosen by the Maidstone growers are such as have been raised from layers, and which have been lined or bedded out in the nursery for two or three years. Each plant should have one strong upright shoot, of not less than three feet in height, this being necessary in order to the future form of the head; and this, early in the spring after the trees have been put out in their final stations, is cut down to about eighteen inches from the ground. This height will admit of a clear stem of twelve inches below, and which part must be at first, and ever afterwards, kept free from shoots, as well as suckers from the root. This deprivation of shoots and suckers will cause the buds left at the top to push with greater vigour. If eight strong shoots be produced in the first summer, they must be carefully preserved, as that number is required to form the head; but if less than this number come forth, then two or three of the strongest (or the whole if necessary) must be shortened back to half their length at the next pruning, in order to obtain the requisite number.

The sufficient number of branches being obtained, if not in the first, certainly after the second pruning, they are to be carefully preserved and trained outwards and upwards; at first nearly horizontal, but curving gradually upward at the point. The easiest mode of doing this is by using a hoop of the proper size placed within the shoots, and to which the latter are tied in star-like order, and at equal twelve-inch distances. Such a laterally curving position may be much assisted and caused by a careful pruner, always cutting at an *outside* bud, which, when grown sufficiently far outwards, naturally turn up to form the permanent branches.

The points of the branches are allowed to rise to the height of six feet, but never higher; and the middle of the tree is always kept free from shoots and branches, so that a well-trained head resembles a large bowl.

The subsequent management of the trees, both while gaining the desired form, and after having gained it, consists in preserving all the short spurs which will be produced on the branches, and cutting

away or shortening the laterals which every year rise from the same. The management of these laterals is of great consequence. If they exceed the length of six inches, they may be cut back to a few buds ; but if less, they should be preserved, as their points are generally fruitful. The grand object with the pruner is to have the branches thickly beset with fruitful spurs, and which are only reduced in length, when, after a few years' growth, they become too distant from the branch, when they are cut back, to a healthy spur behind. If any part of the branch becomes accidentally naked, a strong shoot from the bottom may be led up, and managed so as to fill up the vacancy.

When filbert trees are thus managed, and have arrived at their full volume in width and height, they may be kept in the same state for many years—say twenty or thirty,—by the knife only, and with the requisite skill in using it.

The plantations in Kent are either in single rows, or in entire quarters or fields. The plants are put in at eight or ten feet distances, more or less, according to the quality of the soil. Six hundred and eighty plants are required for an acre, at eight feet distances every way : at ten feet distances, four hundred and thirty-five ; and at twelve feet distances, three hundred and two trees will be required.

The Kentish pruners, who, as observed before, are neither botanists nor physiologists, are notwithstanding well aware of the use of the male catkins, rejoicing to see them in great quantity, and carefully preserving them. From the greater or lesser number of the catkins, they usually predict what share of crop will follow.

The practical example set us by the Maidstone pruners, confirms two very essential principles in the art of gardening, viz. that by counteracting the natural tendencies of a plant, it may be dwarfed, and by thus dwarfing, making it more fruitful. The filbert tree is so constituted, that it is ever extending itself by throwing up a multiplicity of suckers, which exhaust the bearing branches and render them sterile ; but denying the plant its tendency to increase itself by suckers, promotes its energy to increase itself by seed.

Filberts intended for long keeping, should remain on the tree till they are thoroughly ripe, which is easily known by their rich brown colour. They should be laid on a dry floor for a few days, and afterwards stored in jars of dry sand, where they will keep sound for a great length of time."

## ARTICLE X.

AN ENQUIRY INTO THE CAUSES OF THE FRUITFULNESS AND  
BARRENNESS OF PLANTS AND TREES:

With Practical Instructions of the Management of Gardening and Farms, and a System of Training Fruit-Trees, &c. Founded on Scientific Principles. Arranged as a Dialogue.

BY JOSEPH HAYWARD, ESQR.

*Author of the "Science of Horticulture," &c.—12mo. 292 Pages, with Cuts.  
London.*

THE principal object of this work is to convey in a compact and simple form, the substance of the more important parts of the Author's former works on Horticulture and Agriculture, together with the results of much subsequent observation and experiment. The work is written in the form of Question and Answer, in which are discussed the Chemistry of Vegetation, the Nature and Composition of Earths, the Nature and Principles of the Food of Plants, the Generation of Plants and the Production of Varieties, the General Structure of Plants, and their numerous diseases, which together occupy 169 pages; the remainder is occupied with laws as a foundation for Rules of Practice, and a System of Practice, itself founded on Science. The style of writing is plain and intelligible, of which the following Extract may be taken as a sample.

*(Extracted from Page 170 to Page 175.)*

Q. SUCH, then, being the laws and principles ordained by nature, for originating, governing, and determining the growth and productions of vegetables, are they not corroborated by such existing facts, as will admit of the deduction of certain axioms or rules, for the guidance of a gardener in the practice of his art?

A. Certainly: and it will be well to divide, explain, and reduce them to some such orderly arrangement, previously to entering upon an exposition of a system of practice. The chief object for which plants and trees are cultivated in the garden and the orchard, are their flowers, seeds, fruits, and roots; our first care must therefore be, to bring them to, and sustain them in, the most perfect state of fructification. The leaves and stalks also being of considerable importance, both as objects of use and ornament, the growth and disposition of these must likewise be regarded. Now, as for whatever purpose we may suppose vegetables to be created, it is clear that all kinds of plants and trees proceed by progressive degrees in their growth to attain a fructiferous state; and that in their advance from the seed to the attainment of their utmost size, the formation and arrangement of their

leaves and branches are made conformable to the most perfect and symmetrical designs: the practice of gardening can be little more than the assisting of nature in the attainment of her ends, by supplying her with the required nourishment, and affording her support and protection against casual obstructions and injuries. To obtain the desired results of horticulture, therefore, our principal care must be so to regulate the operations of art, as that they may be in perfect harmony with the laws of nature: and as it is of the highest importance that these should be firmly imprinted on the mind, we shall first recapitulate and arrange the laws of nature to which the principal effects are traceable. They may be comprised under the thirteen following divisions:

1st. The generating, or first forming of a plant, or impregnation of the seed with the living principle, requires the junction of two distinct parts or productions of the blossom or flower; that is, it is required by nature that the pollen or dust produced by the anthers be brought in contact with, or placed on, the crown or summit of the pistil.

2nd. To enable the pollen to impregnate the seeds with the living principle, a certain degree of heat is necessary, according to the nature of the plant; some requiring a greater and some a less; but most plants require a degree of heat above 50° Fahrenheit's thermometer, when placed in the shade, and that the sun should shine on them for two or three hours, during some part of the day, for four or five days following, when in bloom, for the purpose of performing the office of incubation and hatching the globules which form the pollen. And it is allowed by nature that the pollen of one plant, when thus brought in conjunction with the pistil of another plant, although a variety of the same species, shall produce the like effect of impregnation; and that the progeny of the two plants shall in some degree partake of the peculiar characteristics of both of them.

3rd. To vegetate seeds, or give the necessary impulse to the living principle, and put it into action, a due quantity of water, and a due supply of oxygen, or a free access of the atmospheric air, and a degree of heat above 50° Fahrenheit, are necessary.

4th. Plants, like animals, require a constant supply of food to sustain them; and as from their peculiar formation, plants cannot consume or take any thing into their bodies but in a state of liquid, water, holding in solution a certain portion of carbonaceous matter and earth, constitutes the nutriment or food of plants; and a continued supply, change, or circulation of water in the soil, is necessary to sustain the life of plants, and to preserve them in health and vigour.

5th. Carbonaceous matter, when dissolved in water, combines with oxygen and hydrogen in different proportions ; whenever oxygen preponderates in these compounds of carbonaceous matter and water, fructification is promoted and sustained ; whenever hydrogen preponderates, plants grow more to leaf and stalk and branches, than to flowers, seeds, and fruit.

6th. The food of plants is taken up by the roots in a state of fluid, impelled upwards through the stem, branches, and leaves, &c., and diffused through the system ; each part of the plant having the power of selecting and appropriating the portion adapted to its use ; the residue, or that which is excrementitious, is thrown off by the leaves.

7th. The roots of plants are gradually propelled and extended into the earth, and there they continue to collect, absorb, and dispense an increased quantity of food, so long as it is supplied, and they grow unobstructed.

8th. The quantity and quality of the food supplied to plants, affect them much in the same manner as it does animals ; that is to say, with a scanty supply of food they grow but little, and with a superabundant supply of food, they grow to the utmost extent of leaf, trunk, and branches.

9th. The leaves form the excretory organs of the plant or tree ; and whether the supply of food be great or small, a plant or tree cannot attain or sustain itself in a perfect state of fructification, until it is furnished with a surface of leaves duly proportioned to the sap supplied by the roots. To enable them to perform their functions, also, it is necessary that the leaves should be duly exposed to the action of light, and to the influence of the sun and the air.

10th. In all erect-growing trees and plants in an open situation, and where the light falls equally, the sap is impelled in a vertical direction, or the inverse of the natural flow of water ; that is, as water always flows in the greatest force through the lowest opening in a vessel or channel, the sap will flow in the greatest quantity into and through the highest opening, or that which is offered by the most vertical buds that are nearest the root. And the strongest and leading branches will grow in an upright perpendicular direction ; but in places where the light has a partial access only, the sap will flow, and the branches bend, towards that side where the light is admitted. In creeping and climbing plants, the sap flows to the extremity of the branches, whether their position be horizontal or perpendicular, and whether such branches be long or short.

11th. The destruction or loss of any part of the buds, or young branches of a tree, will not prevent the growth and extension of the

roots; but these will expand, and the supply of food will continue to be taken up by them, and appropriated to the restoration and reproduction of the leaves and branches.

12th. All trees are furnished with many more buds than they can sustain, to form fruit and branches; the position of the buds determines their office; those which occupy the most eligible situation for extending the branches, are formed for wood-buds; the others form fruit-buds, or lie dormant till wanted to form fruit-buds, or to supply the casual loss of any wood-buds that were above them.

13th. If a bud formed and placed for a leading branch be removed, or its position be altered, or the vessels connected with it be contracted or injured, and the usual passage of the sap be obstructed, the wood-bud occupying the next best position will take its supply and perform its office. And when from any number of buds formed to receive a quantity of sap, a part be taken away, the share of sap which that part would otherwise have received is given to those remaining, and they are extended proportionally."

The System of Practice recommended, appears generally good, and with a few exceptions, we can recommend them from experience. The book deserves to be read by all gardeners; and we particularly recommend it to the perusal of every young gardener, who will find it an excellent guide to him in the Science of his business.

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#### ARTICLE XI.—COLLECTIONS AND RECOLLECTIONS.

**CULTURE OF GERANIUMS.**—The hardy, perennial, herbaceous kinds of Geranium are mostly beautiful plants, with showy flowers, of various hues: these are well adapted for ornamenting flower-borders: they will thrive well in any common garden soil, except the *G. argenteum* and the Nipaul species, which should be grown on rock-work or in pots, in order that they may be protected during winter. A mixture of loam, peat, and a little sand, will suit these last well. The greenhouse and frame species will thrive best in a mixture of loam and peat, or any light vegetable soil: these are readily increased by cuttings, planted in the same kind of soil, or from cuttings of the roots; but the hardy, herbaceous, perennial kinds are to be increased by dividing the plants at the root in spring or autumn, and the whole may be increased by seeds, which ripen in abundance. The annual kinds are in general not so showy as the perennial species: the seeds of them only require to be sown in the open border early in spring.—*Don's Miller's Dict.*

**CULTURE OF THE GENUS ERODIUM.**—Most of the perennial species of *Erodium* are rather ornamental, and they will thrive well in

any kind of soil. The frame kinds will grow well in a mixture of loam and peat or decayed leaves: these are easily increased by dividing the plants at the root, or by seeds which ripen in abundance. The greenhouse species are mostly sub-shrubby; they will thrive well in sandy loam, and leaf mould; and young cuttings, planted in pots filled with the same kind of soil, will strike root: they are also easily increased by dividing the plants at the root or by seed. The annual kinds, several of which are rather handsome, only require to be sown in the open border, in spring, in any kind of soil.—*Ibid.*

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SKETCH OF A FINE OAK TREE (fig.4) that grew in Chatsworth Pleasure Grounds, the top and part of the bole of which was blown off by the remarkable high wind of the 29th of December 1798; by which it was found to be hollow, owing to a large branch having been broken or cut off at an unfavourable season for its healing over, that occasioned internally the dry rot, when a branch bent into its trunk and shot into roots instead of branches, as here represented, and grew down into the ground for a considerable depth. Is it not probable that in time the trunk would have decayed away, and this branch have formed a succeeding tree.

WHITE WATSON.







PASSIFLORA KERMESINA.

# THE HORTICULTURAL REGISTER,

FEBRUARY 1ST, 1835.

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ARTICLE I.—ON CHEMISTRY,  
AS CONNECTED WITH THE DEVELOPEMENT AND GROWTH OF PLANTS  
BY THE AUTHOR OF THE DOMESTIC GARDENER'S MANUAL.

(*Seventh Article.*)

Two Subjects of importance remain to be considered,—namely the *nature and operation of Manuring Substances*, and the *Preparation of Vegetable food*.

*Of Manures*, much has been written, far more than has been applied, or understood. The term is very comprehensive : it includes every species of refuse matter that is produced in the farm yard and house, and the vegetable remains of the garden. I do not intend to particularise: my entire paper might be devoted, solely, to the arrangement of a list; and they who are curious in such things, are referred to the 6th Agricultural Lecture of Sir Humphrey Davy, or to the Encyclopædia of Gardening, article *manures*. It will suffice to state here, that every substance, which is decomposable into oxygen, hydrogen; with occasionally, azotic gases; and into carbonaceous black matter, or its compounds with oxygen and hydrogen, is, properly speaking, a manure, and may be resolved into vegetable aliment. The manuring substances of the dunghill, first claim attention; they have from the remotest time, been considered the very life of the farm and the garden; but much difference of opinion has existed concerning the state in which they should be applied to the land. Some, and indeed the greater number of practical men, have strenuously argued for the utility of letting the mass be reduced to the soft, adhesive condition of spit-dung: others, the Chemists particularly, have denounced the system of protracted fermentation, as wasteful and injurious; they have asserted the decomposition ought to be slowly effected *in the soil*, not in the heap; that—"it is better there should be no fermentation at all before the manure is used,

than that it should be carried too far"—“The excess of fermentation tends to the destruction and dissipation of the most useful part of the manure; and the ultimate results of this process are like those of combustion.”—Davy.

For the purposes of the farm, the medium state adopted by Mr. Coke, appears to be in every way preferable. He forms his mixens, by layers of the several products of the cow-yard and byre, piggery, and stable: presses the heaps as much as possible, by carting over them, and then covers the whole with a slight stratum of earth to retard the fermentation.

The heaps are formed in winter, and remain thus, till within two or three weeks of turnip sowing; they are then turned over, and immediately carted to the fields.

For the Garden, where any superficial dressing is required to produce immediate effect, perfectly rotted manure, or good spit dung, is most eligible; but the most economical process for works, on the large scale, and for permanent crops, would be effected by deep trenching with the spade, and burying perfectly recent farm yard and stable dung, to the extent of four or six inches at the bottom of each trench, sprinkling the surface of the dung with Carbonate of Soda, or common Salt. Decayed manure might be dug in with the surface soil; and thus the ground would be enriched for first crops, and be in a state to receive, gradually, the gaseous products of fermentation from beneath, after a season or two, trenching would bring up the solid remains of the dung, and intermediately, nothing would be lost.

By a similar process, I have produced carrots and parsnips so much superior to those generally grown near me, that they have been admired by all who have seen them.

*Decomposition produces attraction*; the decomposing material ought, therefore, to be so situated as to produce the desired effect. Tap-rooted vegetables require a deeply deposited substance, which, by its local attractive energy may induce perpendicular descent. Potatoes and tuberous roots, require lateral attraction; hence, the manure should be generally extended throughout the surface-spit of each. Fibrous rooted plants ought to find decomposable matter in every direction; and fruit trees should be supplied from above, to prevent deep-rooting, and to secure the lateral and almost superficial extension of the roots. Such are, I believe, the general principles which every gardener might safely keep in view, and observe as the ground of his practice.

*But how do Manures act?* The solution of this question involves

considerations of the deepest interest in the science of gardening. It has generally been believed, that the soluble parts of manures are taken up by the vegetable organs; it has also been maintained that, the carbon of the manure is converted into carbonic acid, and that this acid, in a state of solution in water, is absorbed by the roots. Of late years we have heard much of *Humin*, *humic acid*, neutral *humates*, &c. which substances have been pronounced to be food of plants; and they are said to be found abundantly in the soft, adhesive mass of spit dung. I have stated my views upon the subject of *Humin*, in several articles which have appeared in the *Quarterly Journal of Agriculture*, and *British Farmers' Magazine*; and here, in a few words, I avow my decided opinion that, in the announced discoveries, we have obtained nothing, but merely a set of new names or terms, for that reduced nutritive substance, which every farmer and gardener has familiarly known from time immemorial, viz. the laborated, blackened mass of the dunghill. *Humin*, or reduced manure, is a compound of oxygen, hydrogen, carbon, chiefly; it may also contain azot, and some salts and earths. It is the product of decomposition, effected, when vegetable and animal matters are fully exposed in a heap, to the agency of solar light and atmospheric air; and it varies in its components, in as far as it is formed of substances whose elements may vary. Decomposition, effected by fermentation, is a process of *slow combustion*, and its results may be traced by exposing the substances which would be placed in the dung heap to the action of direct fire. If these be distilled in glass or stone vessels, over a charcoal fire, furnished with recipient vessels for the proper retention of the products, a pungent and oily liquor will be obtained, which has a very disagreeable burnt odour, evincing traces of ammonia. Gaseous fluids are also abundantly given forth, abounding with carbonic acid, and carburetted hydrogen. These distilled products prove, beyond the shadow of a doubt, 1st the presence of Oxygen and carbon to form the *Carbonic acid*;—2nd, that of hydrogen and carbon to form *Carburetted hydrogen gas*, and the *oily* fleeting particles; 3rd, that of hydrogen and azot to form the *ammonia*; and 4th, that of oxygen, hydrogen and carbon, to form an *acid liquor*, which, very frequently, is deposited in the first receiver. If the process be pressed till the matters in the retort cease to yield gases, and become red hot, the analysis of the blackened mass, will detect very compound products. Who, that is uninitiated, would suspect that in a portion of Cow manure; dried, and distilled, and then heated to redness, would be found not only free charcoal, some salts; as sulphat of potassa—Carbonate of potassa, (pearl ash) sulphat and muriate of lime,

and abundance of carbonate (chalk)? and yet these multifarious products, and several other substances, are discoverable in most of the residue of Vegetable combustion. In a word, this process, which is generally considered a work of destruction, terminates in a new arrangement of the vegetable elements, and produces matters which much resemble the staple earths that have been described in the last chemical article.

These facts irresistibly lead to the conclusion that, all manuring substances deposited in the ground, are eventually converted into earths, but in a way and proportion, varying according to the circumstances under which they are exposed, to the decomposing energy of the agents which surround them.

Before I enter upon the second subject of this article,—the Preparation of vegetable food—I must observe, for the information of those who cannot undertake an experiment, for the detection of the elements of fermentative substances, in close vessels, that any vegetable matter, if burnt, will afford satisfactory evidence of the earthy nature of the matters, left in the form of ashes. Let any quantity of dry potatoe or pea-haulm, fern-leaves, bean stalks, tree leaves, or even wood be burnt, and the ashes collected: a drachm, or 60 grains will suffice for an experiment. First, put the ashes into a cup, then pour a quantity of boiling rain-water upon them: stir them once or twice, and, when cool, strain the liquor through paper. The soluble salts are contained in this, and they frequently exhibit alkaline properties, which are discoverable even by the taste. Fern yields potash in quantity sufficient to form a lye for washing. Upon the washed ashes in the cup, pour a little muriatic acid; a considerable hissing (effervescence) will take place. The solution will contain muriate of iron and muriate of lime: the effervescence is occasioned by the escape of carbonic acid gas. Prussiate of potassa will detect the iron; and subsequently carbonate of potassa or soda, will precipitate the lime, in the form of a milk white powder. Second—The remains of the ashes, may now be washed till free from flavor, and tested by a few drops of diluted sulphuric acid; and if the vessel be subjected to a boiling heat for an hour or two, a little alumine will often be taken up, and more iron. Finally, the substance remaining, which cannot be acted upon by the two powerful acids, must be considered siliceous, or of the nature of sharp sand. I do not describe the method of effecting these trials, having already done so in the last article upon the *Analysis of soils*. I have detected every one of these staple earths, in the ashes which collect by burning common cigars; also in those of a bread-oven, heated by furze and common faggots.

How wonderful that the pure, limpid, tasteless sap of the plant, should be converted into the elements of the soil! I say the elements, for who could venture to assert that any plant, living and growing, endowed with the vital principle, contains, *de facto*, the substances of charcoal, flint, clay, chalk, and iron? Many are apt to assert that, the products of analysis must exist ready formed in the vessels of plants; but this is repugnant to the evidence of the senses; and contrary to assured fact; a being endowed with life, is one whose structure and organization qualify it to fulfil its allotted part in the scheme of Creation. But when life becomes extinct, it is made subject to the play of chemical affinities; and then, it affords substances which are the result of decomposition. Terms are wanting to convey a clear idea of what has been effected: in fact we are obliged to confess our ignorance; and, therefore, it is only safe to conclude that, the *Elements* of the new products resided in the plant. I was lately much struck by the reperusal of an article in the first Vol. of the *Horticultural Register*, p. 347, upon *the Native Soil being changed by the application of manure produced from land of an opposite nature*, by Mr. S. Appleby; and I extract the following paragraph.

"The subsoil of my friend's kitchen-garden is a hard rock sand, and the surface-soil formerly consisted of light sand, with the most trifling admixture of loamy earth, being such as commonly abounds in the vicinity of that extensive forest." (Sherwood.) The manure for his garden was carted from his clay farm, and was used unsparingly for two or three seasons, during which period, the soil gradually changed from the light sand I have mentioned, to a loamy consistence. He has continued to apply the same kind of tillage from the stable or fold yard of the clay farm, to the present time, and the original sandy soil of his garden, now approximates to the clay soil of his farm. I beg to observe that the tillage referred to was applied in a rotten state, and had no appearance of being impregnated with any particle of clay, but consisted entirely of ordinary manure, the produce of clay land."

Many considerations of importance are involved in the fact thus detailed. Was the manure really farm yard dung with straw?—if so, was that straw produced solely on the clay farm? Were weeds from the land,—such as the couch-grass of the field, made use of—if they were, much of the adhering soil must have been carried to the heaps. Other questions of the like import might be brought forward; and all such facts demand, and really merit very close investigation. I know, and have spoken, that weeds when decayed, and manuring

substances when reduced to mould, contain chalk, pure clay, and sillex, but I am much inclined to believe that, though a soil, whatever be its native quality, tends to reduce all manuring substances to its own constitution, it may by the introduction of the produce of lands of a totally different character, become ameliorated, and permanently changed. This remark leads at once to the second enquiry—namely—the mode by which *vegetable food is prepared*.

Lands of different qualities require peculiar and suitable applications of manure. There are some rich lands of a close, aluminous, unctuous texture, which, if well supplied with manuring substances, and left uncropped, are found, after many months, to have retained those substances unconsumed, and in considerable abundance. Other poor soils, replete with sharp sand,—and, with great propriety, termed hungry soils,—speedily reduce and decompose whatever is added to them. But in general, manures are found to be rapidly reduced by vegetable crops; and, though the colour of the land becomes darker, the bulk of the dung is found to be removed. Crops, therefore, act upon manure, and they are rich or poor, vigorous or sickly, in proportion as manures are supplied in due or deficient quantities, and of appropriate quality, or the reverse. It may be a question, whether a plant is a being endowed with sensitive life, and a power of perception, whereby it is enabled to seek for, and select food which is applicable to its peculiar constitution; or whether it is a mere organised body endowed with a vital principle, which simply stimulates it to the performance of sundry functions. The theory I advocate presumes the latter; it supposes that every vegetable is a being furnished with an organisation, which qualifies it to be a prime electric conductor; that its vessels are duly acted upon by atmospheric electricity in the form of light, and become thus the most efficient of intermedia between the fluids of the air and those of the soil: that all nature, the air, water, earth or metallic oxides, are replete with light, which is the grand and universal cement, the sole agent of all the natural phenomena.

Under this view, the decomposition of water, of vegetable and animal substances, of salts, metallic oxides, and of gaseous fluids, are processes of electric disturbance. When, therefore, a plant produces, and absorbs sap, I presume that a peculiar energy is excited, primarily by the agency of the principle of light, either direct from the Sun, or by that which lies masked or concealed in the air. This, while it stimulates the vital functions within the plant, and develops its leaves and buds, passes to, and equally stimulates the protruding roots; furnishes them with a kind of galvanic power, which acts upon



the water, and other decomposable bodies around those roots. Hence, the decomposition of the manuring substances, the separation of the carbon, the hydrogen, the oxygen, &c. &c.; and the formation of that peculiar nutritive matter the sap, which it appears like simple water, is nevertheless, a substance, *sui generis*, wholly inimitable by the art of man.

The Theory therefore is founded upon the primary agency of solar electric light; it presumes that the plant is thereby stimulated to prepare its own food; during which process, it effects the decomposition of manures, and reduces them by a slow but certain progress, to the native staple earths of the ground. Earths absolutely without manures are almost inert; but these are of very rare occurrence, all are more or less supplied with a portion of vegetable matter; still however, where the land is taxed by heavy cropping, and where it requires melioration, manuring substances must be supplied in proportion; and these are acted upon and reduced, by a process tantamount to that of a slow combustion. Oxygen, and hydro-carbonous compounds are abstracted; and chalk, alumen, silex, gypsum, oxides of iron, (perhaps, of manganese also,) are added to the soil.

I believe it is admitted by all, that manures are decomposed in the soil, and become the food of plants by yielding carbonic acid to the aqueous fluid in the proximity of the roots. The theory now advocated differs, in fact, but little from that which has heretofore been sanctioned; yet, there is one point which, I doubt not, will be sturdily disputed: viz. the stimulating energy of *Electricity*; or more correctly speaking, of *that pure Ethereal fire which lies concealed throughout all matter*. I have referred to this grandest principle of life and developement, in a former article; and now repeat my firm conviction, that light, primarily derived from the Sun, embues the air, and is the sole cause of the repulsion (if that word be admitted for want of a better,) of the aerial particles; that water, and all matters within the earth's surface owe their form and modes of combination to certain definite proportions of this fluid; and, therefore, that it is the sole origin of all electric, galvanic and chemical action, however these be secondarily excited or rendered manifest.

Electricity has, I believe, been but very imperfectly understood: as an agent in vegetation, the learned Dr. Lindley says,—It is a power of which we know almost nothing certain, with reference to vegetation; if many things have been written about it, it must be admitted, at least, that very little has been proved." (*Outline of First Pr. of Hort.* p. 8.) Something, however, begins to be known, and much has now been proved. I have stated my hypothesis, and

as *authority* is of great moment on some occasions, I venture to refer, to a work which has recently been presented to me, by the author himself. In Dr. Faraday's *Experimental Researches in Electricity* from the *Philosophical Transactions*, we find the following statements.

\* *One grain of water acidulated to facilitate conduction, will require an electric current to be continued for three minutes and three quarters of time, to effect its decomposition; which current must be powerful enough, to retain a platina wire of  $\frac{1}{104}$  of inch in thickness, red hot, in the air, during the whole time;*"—"it will not be too much to say, that this necessary quantity of Electricity is equal to a very powerful flash of lightning. Yet we have it under perfect command; can evolve, direct, and employ, it at pleasure; and when it has performed its full work of electrolyzation, it has only separated the elements of a single grain of water."—after reasoning upon the data furnished by certain recited experiments, the writer adds.

"This view of the subject gives an almost overwhelming idea of the extraordinary quantity or degree of electric power, which naturally belongs to the particles of matter; but it is not inconsistent in the slightest degree, with the facts which can be brought to bear on this point."

I refer now to one experiment,—thus—"Two wires—one of platina and one of zinc, each one eighteenth of an inch in diameter, placed five sixteenths of an inch apart, and immersed to the depth of five-eighths of an inch in acid, consisting of *one drop* of oil of vitriol, and *four ounces* of distilled water, at the temperature of about 60°. of Fahrenheit, and connected at the other extremities by a copper wire eighteen feet long, and  $\frac{1}{18}$ th of an inch in thickness, yielded as much electricity in little more than three seconds of time, as a Leyden battery charged, by thirty turns of a very large and powerful plate electric machine in full action."

My limits will not permit me to copy more; I can only add that, Dr. Faraday, by a comparison of facts, calculates that 800,000 charges of the aforesaid Leyden battery would be necessary to supply electricity sufficient to decompose a single grain of water, or to *equal the quantity of electricity which is naturally associated with the elements of that grain of water, endowing them with their mutual chemical affinity.*"

Now, my hypothesis has, from first to last, supposed that electricity is the sole bond of union between the constituents of all matter; and as electricity evolved by the decomposition of one substance can

\* *Experimental Researches*—Sixth Series, p. p. 116. et seq

alone effect that of another, so when vegetable substances are decomposed in the soil, the phenomenon is effected by the electrising principle of light; and the results are the liberation of a given quantity of ethereal fluid, which accompanies and propels the sap thus formed into the spongioles of the roots.

The processes are those of a beautiful routine; the decomposition of one substance leading to the formation of another; and furnishing, in the subjects under enquiry, new developments to the plant, and staple earths to the soil.

Truly much mystery is still involved, but the facts assuredly discovered, furnish a well grounded hope that, with the advance of electro-chemical science, new and still more important truths, will be revealed, and place the science of Vegetable Physiology, in a situation wherein its phenomena, may be referred to certain well defined laws.

At all events, if the vital principle remain unappreciable, we may reasonably hope that the decomposition of manures will be thoroughly understood; and great improvements in horticulture effected, as a natural and inevitable consequence.

Dec. 10th, 1834.

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#### ARTICLE II.—CULTURE OF THE CAULIFLOWER.

IN Vol. 3, p. 377, we gave the culture of the common red and white cabbages, also the arrangement of the varieties of Brassica, by M. de Condolle. We now preceed to detail the culture of Cauliflower.

The ground on which the cauliflower plants are intended to be planted can scarcely be made too rich, therefore lay on a large portion of rotten dung, and dig it well in.

The best soil in which to sow the seed is one somewhat light, and for the first spring sowings rather rich; at all other sowings this is not material.

Always plant in open, airy situations, for the plants will never form good heads under the shelter or drip of trees; sometimes none at all.

*The Varieties* known amongst us are only two, the early, and the late. The difference betwixt them is very trifling; the one, called the *early*, has a slight purple or red colour in its stalks, and probably is a little hardier than the other, and therefore is generally sown in the autumn, to preserve in frames or under hand glasses, for the first crop in spring.

Cauliflowers are raised annually from seeds, and are liable, like cabbages, to be impregnated by bees &c., during the time of flowering.

There are three principal seasons for sowing, and all three require some little difference in their treatment.

*First Sowing Season.*—This continues from February to the end of March, and the plants are intended to succeed those sown the previous autumn. During this season, two sowings are usually made, one in February, and the other in March; both require precisely the same treatment, which may be stated as follows:—

Make a hotbed about two feet six inches thick, and as broad and long as may be necessary, for the seed intended to be sown.

When the bed is made, put on a frame, and cover it down with lights, to draw up the heat, and let it remain about a week to settle, which will reduce it to something less than two feet; then take off the frame, and level the surface of the bed nicely, and replace the frame again on the bed.

This being done, lay about six inches thickness of light rich soil, and on this thinly scatter the seed; sift a little soil over the surface, just to cover it. On the same bed, both radishes and celery may be sown, as they will interfere very little with each other by being mixed.

After the seed is sown, cover down the frame, and so let it remain, until the young plants begin to appear, which will be in a few days. Then give air, and in a few days afterwards remove the lights altogether, during the day, and merely shelter them at nights from sharp frosts, or heavy dashing rains. Or, if the frame be wanted for other purposes, it may be removed altogether, and the bed merely sheltered by hoops and mats.

If it is not convenient to spare a frame for the purpose, one may be made of turf walls, about eight inches high in front, and twelve at the back, and by laying a few bearers across, it may be readily covered with mats, or even hoops will answer the purpose very well. And should the cultivator not have the convenience for making a hotbed, delay the sowing till March, and select a nice warm border facing the south.

When the plants have become an inch high, prick them out, about three inches apart, either on a warm south border, of light rich soil, or on another slight hotbed; and from this nursery bed, they will be taken to their final destination.

The second crop should be sown in the last week in March, either on a slight hotbed, or on a warm border, which answers the purpose exceedingly well at this time of the year.

*The Second Sowing Season.*—The sowing at this time is to produce what are usually termed the Michaelmas crop of cauliflowers.

This sowing should take place about the third week in May, and a shady border should be selected for the purpose; or if the weather becomes very dry, the plants will suffer notwithstanding all the care that may be taken in watering.

Prick out the plants, when large enough, as recommended for the early sowings, and allow them to remain there until the third week in July, when they may be transplanted into the situations where they are to form heads.

*Third Sowing Season.*—This season extends from the middle of August to the middle of September, and is intended to produce plants to stand the Winter, and to plant out early in the spring for the main early crops, which are generally the finest. We prefer sowing this crop about the second week in September, because when sown in the middle or towards the end of August, they often become too large before winter, and are more liable to be injured by frost, unless they are checked in their growth, which often ends in their buttoning; that is, forming small heads very early in the spring, which, to say the least, is a very great disappointment.

Sow the seeds on a warm border in light soil, and when they are large enough, which will be about the beginning of November, transplant them in the situation where they are intended to stand the winter. This is either under a South wall, where they will receive no covering, under hand glasses, or in frames.

Where the cultivator has not a frame or hand glasses to spare for the purpose, they will do remarkably well if planted as close under a south wall as they can be placed; and if the weather be very severe, a slight shelter may be given them, but in general, this is unnecessary. These will not be quite so early in forming their heads as those in frames, or under hand glasses.

*Planting under Hand-glasses.*—Prepare some rich ground, in a warm situation, for this purpose, by digging in a good quantity of rotten dung. Then place the hand glasses about four feet distant from each other, and proceed to plant from six to twelve plants under each, according to the size of the glass. If the day be dry when they are planted, it will be necessary to give them a little water; place on the glasses, and keep them close shut until they begin to grow; then raise the glasses on the south side, with a brick, to admit air in fine weather, being particularly cautious not to keep them too tenderly.

In fine mild weather, during winter, take the glasses entirely off all day, but in frosty weather, and very heavy rains, secure them well from being affected, otherwise in spring, most of the plants will be

lost. They may be easily secured from frost by mats or litter, and from rain by shutting the glasses closely down.

It is very possible, that in mild weather, towards spring, the plants will be infested by slugs; the evils resulting from these may be prevented by sprinkling quick lime round each plant, or sowing it all over the ground amongst them.

Keep them sheltered by these glasses till towards the end of April, (continuing fully to expose them in all fine weather, and secure them from frost;) at which time they will have been thinned out to three or four under each glass, and those drawn out, have been planted in the situations appointed for them to produce beds.

*Planting in Frames.*—Place the frame on a south aspect, and in the beginning of November, or the end of October, transplant the cauliflower plants in rows, four inches apart, and three inches from plant to plant in the rows; place on the lights, and keep them close shut down, until they begin to grow, then give air in fine mild weather, as recommended before, for those in frames; but secure them from frost by mats or litter.

A method we have practiced at Chatsworth, for some years, may be safely depended on, for producing heads somewhat earlier than can be obtained by the usual mode of planting in frames. This is, by potting a number of fine plants in 60 sized pots, at the end of October, and plunging them in the frame, with the other plants. On the approach of spring, if these roots have filled the pots, it would be advisable to place them in layer; they will greatly outstrip the others in growth, and at the end of April, when they are planted out in the open ground, they will be a good size; and meeting with no check in their removal they will speedily form their heads.

Some persons keep the pots in a vinery, or other house, where a moderate heat is kept; we have tried this plan with success, but they are liable to button, after being turned out.

*Final Culture, &c. of the three crops.*—The mode of final culture for all is much the same in substance, but differs in detail, in consequence of the seasons at which they are sown; so that it becomes necessary to treat of them separately. And first:—

*Final Culture of the first Sowing.*—In the beginning of May, prepare to plant them in their final destination, which must be on an open, rich, quarter of the garden, well manured for the purpose.

Take up the plants carefully from the nursery beds, with good balls, and plant them on the quarter prepared for them, in rows four feet apart, and two feet six inches from plant to plant in the rows.

If the weather be dry, water them as often as they require it;

either with manured water, or not, as may be convenient; the former will stimulate the plants to grow finer.

The plants raised from the second sowing, at this season, should be finally planted on a rich North or North-east border, where they will produce heads from the beginning of August.

*Final Culture of the Second Sowing.*—About the end of the second week in July, plant these, as recommended for the last, on an open quarter. Give them water as often as they require it, and they will begin to produce heads in October; and, if the weather be mild, will continue to do so throughout November and December.

*Preserving during Winter.*—There are many ways of doing this, a few of which we will detail:—

Cut them on a fine dry day, strip off all the leaves, except those close to the head, and bury the heads under dry peat earth; this plan answers very well; for keeping them, but they become so filled with dirt that they rarely or ever can be got wholly free from it again.

Another way superior to the last, because they are not so liable to be dirtied, is to put them in boxes or small barrels, and bury them in a stock of turf, such as is used for burning. We believe this was originally practised by Mr. M'c Intosh, who detailed it in the Gardener's Magazine; this system, however, has its disadvantages, for the close confinement of the heads in boxes or barrels gives the vegetables an unpleasant taste.

They also keep exceedingly well buried in sea sand, perhaps better than in any thing else yet made use of; but they are liable to the objections made against the first system; namely, becoming filled with grit, which can scarcely ever be removed; and another obstacle presents itself here, sea-sand cannot be obtained without greater expense in inland counties, than the value of the cauliflowers would warrant.

A system is mentioned in the Caledonian Horticultural Transactions, which consists in burying the whole plants out of doors. On a fine day, dig a trench close under a wall, wrap the leaves well about the heads of the plants, and place the plants head downwards in the trench; then lay the soil lightly over them, in a sloping direction from the wall, and smooth off the surface with the spade, that it may carry off the rain. This system, however, we can say little about, having never tried it.

Another plan often practiced, is to draw up the whole plants on a dry day, and without trimming off any leaves, hang them up by the heels to the roof of a dry, airy shed; the only objection to this plan, is, that the heads lose all that beautiful crispness, and become flabby, and less pleasant to the taste.

Another, and a still better plan, is to take them up in fine weather, with good balls, and plant them in good light rich soil in a back shed, mushroom shed, or any other convenient place of the kind; and if kept free from dead leaves, they will soon form their heads in that situation, and be very good for table.

But the best method we have met with, where there is the convenience, is to plant them in a brick pit, when severe weather comes on, and by removing the glasses in fine weather, and preserving them from foul, we have cut very fine heads, as good as could be grown out of doors, until the middle of February, when the winter was very severe.

*Final Culture of the Third Sowing.*—About the middle of April, take up those plants with good balls, that have stood the winter under walls and in frames, and plant them in the situations appointed for them to form heads.

Take up all, except three or four of those remaining under hand glasses, and supply all deficiencies, about the end of March. Draw a little earth round the stem of each, give them plenty of air, by propping up the glass on the south side, and as the plants advance in growth, raise the glasses all round by means of bricks, and finally, about the beginning of May, remove the glasses altogether.

The crops will, therefore, come into use as follows :—

1. Autumn sowing for preserving through the winter.
  - a. Those potted, and preserved in frames, and finally planted under hand-glasses, at the end of March, will produce heads early in May.
  - b. Those growing under hand-glasses, either planted from the frames at the end of March, or having stood there all the winter, will produce heads by the end of May.
  - c. Those removed from the frames in April, to the open quarters in the garden, will produce by the middle of June.
  - d. Those sheltered under walls, and planted in open quarters in April, will produce by the end of June.
2. Those sown on a hotbed, in February, and planted out finally in May, will produce heads by the end of July or beginning of August.
3. Those sown on a warm border, in March, and finally planted out in May, will produce by the middle of August, or towards the beginning of September.
4. Those sown in May, and finally planted out in July will begin to produce in October, and continue through the winter:

*Insects and Diseases.*—Whilst young, they are often destroyed by



the ravages of slugs, and when grown to a large size, they are often infested by caterpillars, particularly those of the green-veined White Butterfly (*Pontia Napi*) which secrets itself in the head, and is hard to be discovered, the Turnip Butterfly (*Pontia Rapæ*.) The Cabbages Brightline Moth, (*Mamestre oleracea*), and the common Cabbage Moth (*Mamestre Brassicæ*.) The only way of keeping clear of these is to hand-pick them.

They are also infested with the larvæ of a fly, which causes the clubbing at the roots; many means have been adopted to prevent this, none of which, to the best of our knowledge, are efficient remedies. Charcoal dust has been found to have a good effect as a preventative, when spread over, and dug into the bed, and soot has been found to have a similar effect, but neither can be depended upon, at all times.

Destroy the Grub that eats off the stem below the ground, as recommended, Vol. 3, p. 380

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## FLORICULTURE.

### ARTICLE III.—CULTURE OF THE BOUVARDIA TRIPHILLA.

ABOUT the middle of April, collect all the Bouvardias together, from the places where they have been kept through the dormant season: some amongst the orange tubs, others in cold frames, and others under the stage of the greenhouse.

Turn them all out of their pots, and shake the soil completely from the roots: thin off most of the large roots, yet retain as many of the fine fibrous ones as possible. At the same time, cut down all the former years' shoots, retaining only two, three, or four eyes on each, according to the age or strength of the plant.

Plant them in pots suitable to the size of the plants, taking care never to overpot them, nor to cramp the roots by confinement.

When potted, water them to settle the earth about their roots, and place them in a cold frame, covered with hay and mats at night: keep the lights close during the night, and even in the day, (unless the sun be very strong upon them,) till they begin to grow; then give them portions of air, according to the day, and their advance in growth. Subsequently, leave the lights off through the day, and lastly, do not put them on at night.

In about a week after they have been thus exposed, plant them finally out for the season, either in clumps by themselves, or distributed among other plants, after which they are soon in fine bloom, and continue to flower till Christmas. By the autumn, some of the

years' shoots will have attained nearly a yard in length, and will be crowned with fine luxuriant clusters of splendid trumpet-like flowers.

As soon as frost is apprehended, take up the plants with balls of earth attached to their roots, disturbing the young growing fibres as little as possible, and place them carefully in pots that will admit of a little good mellow soil under the ball, and around it.

When they are thus carefully replaced in pots, and watered so as to settle the mould, those which are in luxuriant bloom may be mixed amongst the greenhouse plants, where they will make a splendid appearance till January.

When the plants begin to shed their leaves, and the flowers are nearly gone, put them out of sight, as mentioned above, until April.

This treatment may be continued with the same plants for many years; for the application of fresh soil, the trimming of the old roots, the great luxuriance gained by growing without confinement of their roots in congenial soil in summer, renovate the plants, which could not be effected by any other means of culture.

Bouvardias are propagated by cuttings of the roots, which are managed as follows:—fill some large fruiting pine pots with good fresh mellow loam; well blended with either thoroughly rotten dung or vegetable mould.

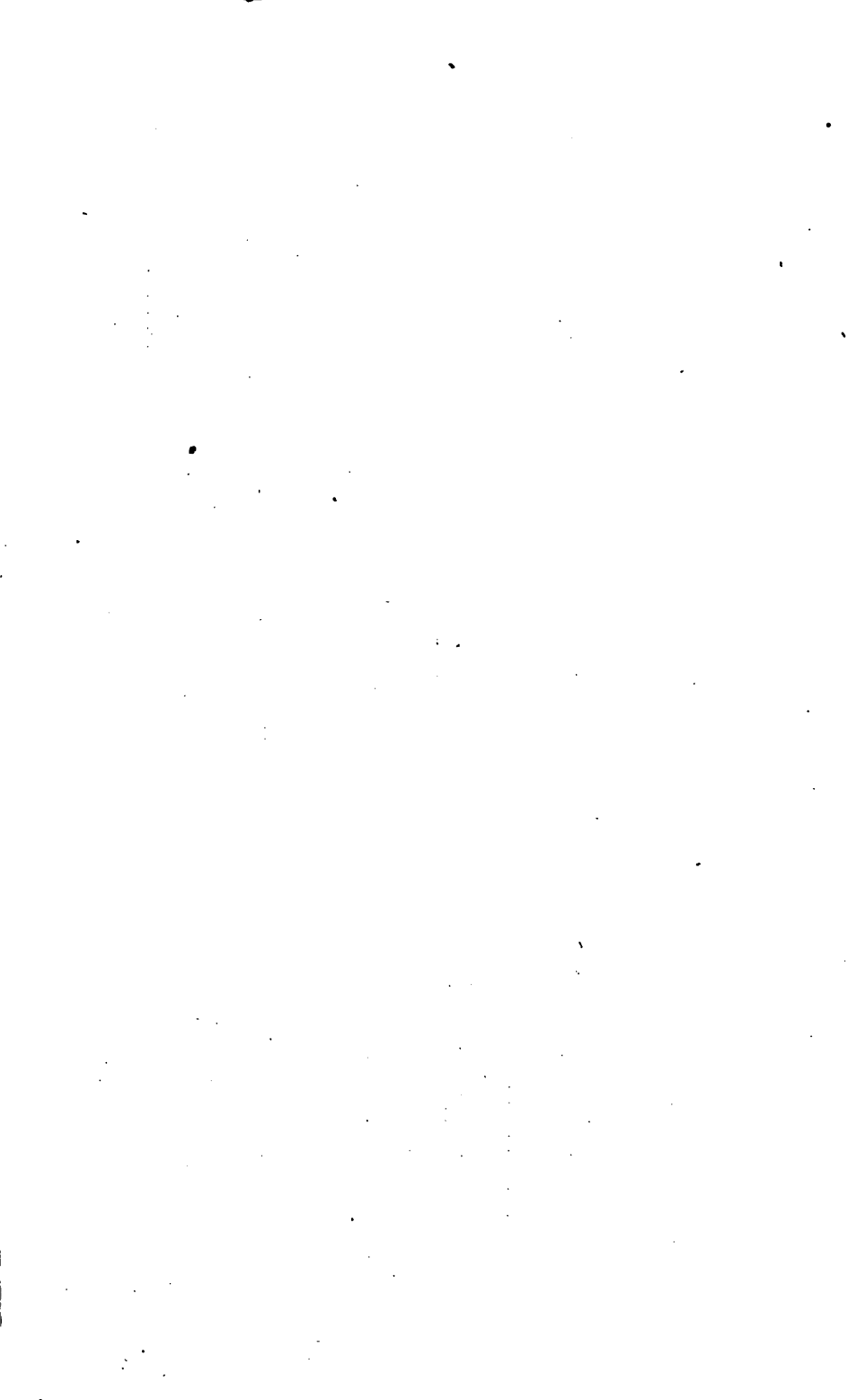
Plant the roots all over the pot, beginning in a circle round the outside, opening the soil and planting them with the finger, continuing to fill up one circle within another, till it is finished in the centre of the pot, leaving no more of the root visible above the surface than just at the top.

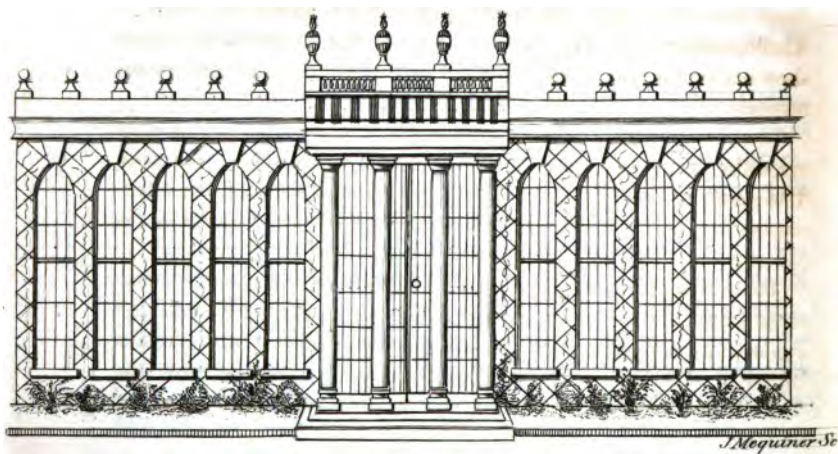
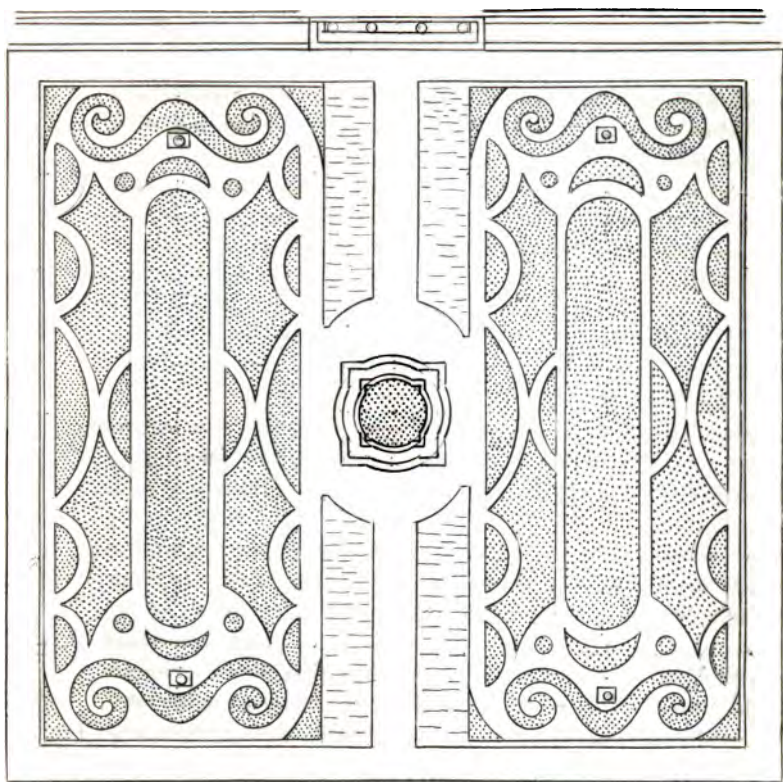
When planted, water, and place them in a hothouse, where the temperature at night is kept between 60 and 70 degrees Fahrenheit.

As soon as the shoots have grown to between four and five inches high, transplant the plants singly into pots of a small size, and by degrees harden them, after they are established.

When they have made some progress after this transplanting, plant them out into a bed, four feet wide; place the plants in rows, eight inches apart, and four inches from plant to plant in the rows, where, if the soil be good, many will soon be in flower. Pot them again before frost, and treat them as directed for the older plants.

The above excellent mode of cultivating this beautiful plant was first described by Mr. Mearns, Gardener to His Grace the Duke of Portland, Welbeck, Notts., in a letter to the London Hort. Society, and in whose "Transactions" it was published, Vol 7, p. 501. The plan answers well, and deserves to be followed by all who grow this lovely plant: we have, therefore, given the details nearly in Mr. Mearns' own words.





*J. Mequiner Sc*

If it be not convenient to take the plants up in autumn and pot them, they may be allowed to remain in the ground, for they will bear a considerable degree of frost; but it is best to cut them down in the winter, for two reasons: First, because they are more readily defended from the severity of winter by litter, leaves, sawdust &c., and secondly, because a quantity of young shoots, (which always produce the first flowers,) are pushed out early in the spring; whereas if not cut down, the shoots start weakly, and are much later.

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#### ARTICLE IV.

##### GEOMETRICAL FLOWER-GARDEN, AT CHATSWORTH.

THE accompanying plate represents the small Flower-Garden in front of what was formerly the Greenhouse, but is now converted into a plant stove; of which, as it answers the purpose exceedingly well, we shall give a plan in our next.

The various species of bulbs and other flowering plants, planted in the beds, preserve a constant succession of blossoms nearly the whole year, at least as long as the weather will permit.

The ground devoted to this purpose is perfectly square, the outer walks being 120 feet long on each side; these walks are 7 feet wide, and the centre one is 9 feet. The centre of the square is occupied by a quadrangular clump of plants, surrounded by stone-work, elevated 4 feet above the level of the ground, having an ascent of three steps. Within this, are plunged ornamental greenhouse plants in pots, such as pelargoniums, &c., during the summer, which flower beautifully, and from their elevation make a fine show. When these cease flowering, their places are occupied by American plants, as Rhododendrons, &c. &c., in pots, to stand the winter, and make a show early in spring, before it is prudent to turn out any greenhouse plants.

On each side of the centre walk is a verge of grass, 10 feet wide, extending from the centre quadrangle to the outer walk, each way. The small walks are 2 feet wide, and are edged with box, kept neatly cut, so as not to interfere with the breadth of the walk, nor hide the contents of the border.

The eight corner beds are planted with crocuses, for making a show early in the season; and when these are over, they are filled with annuals, as German asters, &c. &c., to flower during summer and autumn. All the semicircular beds are planted with hyacinths, Van Thol Tulips, Narcissus, &c., for spring flowering, and afterwards with

some of the most showy hardy Annuals and Greenhouse plants, which keep up a gay appearance during summer and autumn.

The two long beds are planted with moss roses, which are layered so as to cover the whole surface of the bed ; along the centre of each of these beds, is planted a row of half standard perpetual roses, which, from their long continuance in flower, compensate for the nakedness of the beds, after the moss roses have done flowering.

The four round beds, at the ends of each of the long ones, are occupied with hardy heaths ; also at each end of the long beds is fixed a pedestal, on which is placed a vase, or any thing else that may suit the taste, as Chinese fancy pot-work, &c. The remainder of the beds are planted with a mixture of herbaceous, annual, and greenhouse plants, so arranged as to make a constant shew during three quarters of the year, and as much of the remaining quarter, as the weather will permit.

## ARTICLE V.—NEW AND RARE PLANTS,

FIGURED IN THE PERIODICALS FOR JANUARY.

### CLASS I.—PLANTS WITH TWO COTYLEDONES, OR SEED-LEAVES.

#### SOAP-TREE TRIBE, (SAPINDACEÆ.)

**EUPHORIA LONGAN**, The Longan Tree. The Litchi and the Longan are two of the finest fruits that the Chinese possess. Both are occasionally sent to England as presents, but they are never seen in the shops. This species seldom flowers, and has produced its fruit in only one place in this country ; namely, at Mr. John Knight's, of Lee Castle, near Kidderminster, in the year 1816. It is a very tender stove plant.—*Bot. Reg.* 1729.

#### SWALLOW-WORT TRIBE, (ASCLEPIADEÆ.)

**STAPELIA GUSSONEANA**, Sicilian Stapelia. One of the greatest geographical curiosities we know. The genus does not possess one other species, which is not found in Southern Africa ; so that this, which is a native of rocks on the south of Sicily, is cut off, as far as we know, from all the remainder of the Genus, by the whole continent of Africa. It was brought to this country by Mr. Bentham.—*Bot. Reg.* 1731. The flowers are small.

#### FIG MARIGOLD TRIBE, (FICOIDEÆ.)

**MESEMBRIANTHEMUM RUBROCINCTUM**, Red-edged Fig Marigold. A species which may perhaps be considered the finest of this very extensive genus. It is nearly related to *M. spectabile*, from which it differs in its larger flowers and leaves, and in its connate bracts. It

is a native of the Cape of Good Hope. Independent of its extraordinary beauty, this species has the great merit of being able to resist as much cold as a pelargonium, and consequently of being capable of enduring a very mild winter in this climate. Even in our most severe seasons, it is only necessary to protect it with a few layers of matting from the wet, and no fear need be entertained of preserving it.—*Bot. Reg.* 1732.

#### FIGWORT TRIBE, (SCROPHULARINÆ.)

**COLLENSIA BICOLOR**, Two coloured Collinsia. A new handsome hardy annual, introduced by the Horticultural Society, from California, in 1833. It thrives well in common black garden mould, where it grows from a foot to a foot and a half high, and produces its pretty two coloured (purple and white) blossoms most copiously, in May and June, when it has been sown the previous Autumn; if sown in May, it will flower in August and September.—*Bot. Reg.* 1734.

#### THE GREEK VALERIAN TRIBE (POLEMONIACEÆ.)

**PHLOX CORDATA GRANDIFLORA**, Great-flowered cordate Lichnidea. This beautiful hybrid phlox was raised by Mr. Clark, nurseryman and florist, East Retford, Notts. It comes the nearest in habit to the cordata, of which it is most likely a variety; from this species however, it differs in the size of the flower, and the clear white eye. It grows very strong whilst young, and produces leaves of a large size, but the whole plant is dwarf, seldom rising higher than three feet, two of which compose the spike of flowers. The spike is something pyramidal, the lower branches projecting about a foot from the main stem, and gradually diminishing in length until they terminate at the summit of the plant in a crown of flowers. It is a beautiful showy kind, with rose coloured flowers, perfectly hardy, and no doubt will be found to thrive in almost any soil and situation, but particularly in a light rich loam. The fragrance of the flowers is more powerful than that of the corymbosa, nearly equalling the common lilac.—*Paxton's May. of Bot.* 268.

#### THE FLAX TRIBE, (LINEÆ.)

**LINUM MONOGYNUM**, Monogynous Flax. A very pretty white-flowering perennial species, native of New Zealand, and apparently almost hardy, flowering and perfecting its seeds freely in the open border; but it should be protected in a pit or frame during winter. A mixture of peat and loam will be found to suit it best, and it may be increased either by slips or seeds.—*Brit. Fl. Gard.* 270.

#### THE MINT TRIBE, (LABIATÆ.)

**GARDOQUIA HOOKERI**, Carolina Gardoquia. An ornamental little shrub, with rich scarlet flowers, well deserving the attention of the

cultivator, both on account of the delicacy of its habits and its large showy blossoms, which rival those of the *Salvia fulgens*. It thrives best in a mixture of sandy peat and loam, and is increased with facility by cuttings. It will require the protection of a frame in winter, and the pots should be well drained, and be plentifully supplied with water while in a growing state.—*Brit. Fl. Gard.* 271.

THE NIGHTSHADE TRIBE, (SOLANÆ.)

**BRUGMANSIA SANGUINEA**, Dark-red Brugmansia. A truly splendid species, raised at Hayes Place, Kent, the seat of Miss Trail, from seeds collected at Guayaquil, in the state of Equador, by Mr. Crawley. It possesses a hardier constitution than *B. arborea*, delights in a rich friable soil, and is easily increased by cuttings. In a sheltered border, with a southern aspect, it will no doubt flower as well as if contained in the conservatory.—*Brit. Fl. Gard.* 272.

THE PRIMROSE TRIBE, (PRIMULÆ.)

**ANAGALLIS MONELLI** *Willmoreana*, Willmore's Italian Pimpernel. This is a beautiful variety, with rich purple-blue flowers. It was raised by Mr. Willmore, from seeds sent from Madeira. It thrives well in a light, rich soil, and continues in flower for a considerable length of time.—*Bot. Mag.* 3380,

CLASS 2.—PLANTS WITH ONE COTYLEDONE, (OR SEED LEAF.)

THE ORCHIS TRIBE, (ORCHIDÆ.)

**ACANTHOPHIPPIUM BICOLOR**, Two-coloured Barrel Orchis. A highly curious, and extremely rare epiphyte, found in Ceylon, by Mr. Watson, the superintendent of the Government Garden at Peradenia, and transmitted by him to the Horticultural Society. It succeeds well in a mixture of peat and sand, mixed with broken pots, provided it has a great deal of heat and moisture during the growing season, and a few months rest annually in a cool and dry atmosphere.—*Bot. Reg.* 1730.

**HABENARIA GIGANTEA**, Gigantic Habenaria. This species was found by Dr. Buchanan, in Upper Nepal, and in the Mysore country. It was sent to the Glasgow Botanical Garden, among other terrestrial Orchideous plants, from Bombay, by Joseph Nimmo, Esq. The flowers are very fragrant, of a greenish white colour, and measure nearly four inches diameter.—*Bot. Mag.* 3374.

**MICROTIS PARVIFLORA**, Small Flowered Microtis. Sent by Allan Cunningham, in 1824, with others of the very curious terrestrial Orchideæ, of New South Wales, to His Majesty's Garden at Kew. In the Colony of Port Jackson, the species affects clayey soils in low, damp forest grounds, where, should the season prove moderately



moist, and therefore favourable to the reanimation of the whole tribe, appears in abundance, with several species of *DIURIS*, which like the Crowfoots of our English Meadows, bespangle the grassy lands of that colony, by their rich and various bright yellow flowers, in the months of spring.—*Bot. Mag.* 3377.

*MICROTIS MEDIA*, Middle-sized *Microtis*. When Capt. King returned from New South Wales, in 1823, he brought home with him turfs of the *Cephatotus* of King George's Sound, at which port he had touched in his passage. From the sod that contained the Anstralian Pitcher-plant, sprang up, unexpectedly, this *Microtis*. Its flowers, like those of the last, are small, and of a yellow green colour.—*Bot. Mag.* 3378.

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## ARTICLE VI.

PASSIFLORA KERMESINA, CRIMSON FLOWERED PASSION FLOWER.

(See Wood Engraving.)

IN Vol. 3, p. 41, of the *Horticultural Register*, our readers may probably recollect, that in noticing the new plants figured in the Botanical Periodicals, we named the *Passiflora kermesina*, as being beautifully figured in the Botanical Register for December, 1833. We were much struck with the beauty of the flower, and with Dr. Lindley's remarks upon it, and in consequence of our own plants not being in flower, we had a wood cut made from this fine figure of the Doctor's, intending to have offered a few remarks on the progress of Botany in Britain, and on the value of the three leading periodicals of the day, viz. the Botanical Register, the Botanical Magazine, and the British Flower Garden, and so to have introduced the wood cut of this passion flower. But being prevented by a multitude of engagements from prosecuting our design, and having an opportunity within two months afterwards of figuring one for our Magazine of Botany, which appeared in the following March, we were induced to postpone the insertion of the wood cut. We now give it, not, it is true, attended with the proposed remarks, (which we shall defer for a month or two longer,) but with a short account of the culture of several other species. It may not be amiss just to notice here by the way, that the number of new plants figured annually in the above three periodicals give us some idea what is going on in the Botanical world. As to the Botanical Register alone, out of the ninety-six plates given last year, nearly half were either entirely new, or old plants of value which had been lost, and were re-introduced.

**CULTURE OF THE P. RACEMOSA.**—This fine species thrives well with us at Chatsworth, potted in a mixture of loam and peat, and placed in the orchidea stove, where it obtains plenty of heat and moisture.

If cuttings be made of the firmest of the previous season's wood, in May, and they be planted in pots well drained with potsherds, and filled with up sand, and afterwards placed in a temperature of from 70 to 80 degrees Fahrenheit, drying them occasionally to prevent their damping off, but little difficulty will be found in striking them. These will make fine plants by autumn.

The greater part of this genus require the heat of the stove; the *P. Quadrangularis*, in particular, seldom does well except it be grown in the corner or side of a bark bed. Either, therefore, make a square partition with bricks or boards, one foot wide, and two feet deep, or make a box for the purpose, and plunge it on one side of the tan pit. Leave in this box or division several holes round the sides, for the egress of the roots; fill the box with good rich loam, and place in the plant. Every autumn, shorten the stems of the plant in a similar manner to cutting a vine; that is, if the young shoots are found weak, shorten them to two or three eyes off the old wood, and the stronger ones proportionally.

In February, just before the plant begins to grow again, raise it, if convenient, out of the box, trim its roots, and, after having put in a supply of new soil, replace it. If not convenient to raise it, take out so much of the old soil as can be got round the sides of the box, reduce the ball one-third, and add a fresh supply of loam. Abundance of water is also requisite during the flowering season, or the fruit will set very shy, even with impregnation. Fruit are produced from the end of June till Christmas. This, in connexion with *P. edulis*, *alata*, *ligularis*, *incarnata*, *maliformis*, and *lancifolia*, and grown for their fruit in America, where they are known by the name of Granadillas, because the fruit bears a resemblance to the Granada, or Pomegranate.

*Passifloras* are sometimes rather shy at setting their fruit; this may be remedied by impregnating with the pollen of other species, in preference to their own pollen.

The *Alata* will grow under the floor of a hothouse, and in other situations where most of the stove species will *not* live; only it is necessary to keep the roots quite moist.

The *racemosa* will bear fruit, if impregnated with the pollen of *alata*, or other species, but shows no disposition to do so when confined to its own stamens.

All the stove species require cutting in more or less every autumn.

## NATURAL HISTORY.

## ARTICLE VII.—GENERIC DISTINCTIONS IN PLANTS.

THE generic distinctions of plants according to the Linnæan or Sexual System, are regulated by the fructification. The parts known to early Botanists were few, and might be well thought insufficient for distinguishing the various productions of nature. They, therefore, had recourse to the habit of plants, and other circumstances, for substitutes, and by this means a greater number of genera were established, which the new system is forced to reject. The fructification being admitted as the only sure foundation of the generic distinctions, all vegetables that agree in their parts of fructification, are to be put together under one genus, and all such as differ in those parts are to be divided. The characteristic part of each genus is to be fixed from the number, figure, proportion, and situation of all the parts; but as there are few genera, wherein all the parts are constant in every one of the species, recourse must be had to some one single circumstance that is constant, and make it the essential character. This in most genera may be found. The distinguishing part of *Alyssum* lies in the denticles of the stamina; in *Bignonia*, a mutilate stamen; in *Ranunculus*, it is the nectary which is a pore in the claws of its petals; in *Hydrophyllum*, by the same, though a closed chink in the lacinæ of the corolla; in *Helleborus*, by its being tubulose; in *Pancrantium*, the stamens are inserted into the nectarium; in *Hyoscyam*, as there is a covering to the capsules; in *Reseda*, a lateral nectarium, but varies in its corolla and pistillum. The *Campanula* has a quinquevalved nectarium, but it is inconstant in its corolla and capsule; and lastly, in *Iris* has a stigma of singular construction, but varies in the beard of its corolla. There is, however, one part of fructification that can be relied on as a constant characteristic mark for all genera, it being found that the part which is constant in some genera, will be inconstant in others. Thus in *Carica*, the flowers of the male part are monopetalous, and those of the female pentepetalous; in *Myrica*, some species have naked seeds, others berries; in *Fraxinus*, some have a naked flower and others a corolla: in *Geranium*, some have a regular corolla, others irregular; in *Linum*, some are pentapetalous, others tetrapetalous; in *Aconitum*, some are tricapsular, others quinquecapsular; and in *Trifolium*, some are monopetalous, others polypetalous, some monospermous, others polyspermous. This inconstancy of particular parts of many genera has been another source of error in the earlier Botanists, who have parted many plants from

their congeners on this account. When the characteristic mark of any genus is wanting, in any particular species, we should proceed with caution, lest we confound genera that should be distinguished; and when this mark of any genus is observable in some species of another genus next of kin to it, a like caution is again necessary, lest we should multiply the genera, by parting species that should stand together. Thus we find in the *Sedum*, and *Cotyledon*, the nectary adheres to the base of pistillum; in *Epilobium* and *Oenothera*, the calyx is tubulose, and in *Mespilus*, and *Crætagus*, the structure of the flower is alike. The more constant any part of the fructification is found, throughout the several species of any one genus, the more it may be relied on with certainty, as a characteristic mark of that genus. Thus, the nectarium in *Hypecoum* is constant, but not the siliqua; the *Convallaria* is constant in its spotted berry, but not in its corolla; the *Lobelia*, in its corolla, but not in its fruit; and the *Cassia* in its corolla, but not in its siliqua. In some genera, one part of the fructification is found to be most constant, and in others another, but there is no part that is not subject to variation; thus we find the pericarpium variable in the genera of *Impatiens* and *Primula*, and the seeds in *Ranunculus* and *Alisma*.

If the flowers agree, while the fruits differ, the genus must not be parted. Thus in the extensive genera of *Hedysarum*, *Cassia*, *Acacia*, &c., a great number of species have been ranged under the same genus, on account of the conformity in their flowers, though there is variation in the fruit. That the figures of the flowers are more certain than that of the fruit, appears from any examples, as from *Campanula*, &c., but there is a great variation sometimes in the proportion of the parts of that figure. The number of the parts is also liable to variation, and is sometimes found to vary even upon the same plant, particularly in *Garden Rue*, (*Ruta graveolens*) *Adoxa*, *Tetragonia*, &c., in the flowers of all which the number of the parts vary from five to four. In these doubtful cases, the natural number must be collected from the primary flower, but in the variation of the number of the parts there is a proportionable affinity worthy of remark. In flowers, the stamina usually vary from ten to eight, and from five to four; the calyx and corolla from five to four and the whole flower from four to three; and the fruit usually varies from five to three, and five to four. The situation of the parts is the most constant, very rarely varying in the same genus.

The regularity of the petals is not so much to be depended upon, for we see in *geranium*, the European species have regular corollas, but the African have irregular ones. The nectarium nature has

been made of the greatest consequence in forming genera; this part had not even a name before Linnæus had distinguished it, and which is a very decisive and sure mark, and can be relied on.

The stamina and calyx being less subject to luxuriancy are far more certain than the petals. The corolla varies as to its figure in many genera, and also to number, being in *Ranunculus* and *Hilleborus*, pentepetalous in some, and polypetalous in others, in *Statica*, pentepetalous, and monopetalous; in *Fumaria*, dipetalous and tetrapetalous, and the number is also variable in the same species, as in *Carica* and *Jatropha*.

The structure of the pericarpium was formerly thought to be of great consequence in determining the genera, but there are examples that demonstrate the contrary. There are a great many genera that have been established on distinctions in the pericarpium, which are now rejected.

The characters of luxuriant flowers whether eunuchs (deficient of stamens) or mutilate (deficient of calyx and corolla) cannot be allowed any place in determining the genera, for in full flowers no number of petals can be assigned, and the stamina are generally wanting, the number of which makes a part in the generic character; and in mutilal flowers, the corolla would be excluded from the description contrary to the nature of the other species of the genus. But as the calyx in full flowers is scarcely ever altered, it may detect the genus, and the lowest series of petals in polypetalous corolla remaining the same, in respect to number, the genus may be often known by that character, as in *Rosa*, *Nigella*, and *Papava*.

#### SPECIFIC DISTINCTIONS.

Generic distinctions, I have shown to depend on the form of the fructification, and to be confined to that alone; specific distinctions take their rise from any circumstance wherein plants of the same genus are found to disagree, provided such circumstance is constant, and not liable to variation by soil, culture, or other accidents. Hence Linnæus asserts the species to be as many as there were different forms of vegetables produced at the creation, and considers all casual differences as varieties of the same species. I shall now treat of those circumstances by which species are determined with certainty.

The root often affords a real specific difference, and is sometimes the chief distinction, as in *Scilla*, where the species are scarcely to be distinguished but by the bulbs being tunicate, solid, or squamose; and in *Orchis* where the species are known by the roots being

fibrose, tereted, or testiculate ; but as access cannot always conveniently be had to this part of the plant, it is better to fix the specific distinction on some other circumstance equally constant, if it will admit of it.

The trunk often furnishes a sure mark of distinction. Thus in *Hypericum*, *Convallaria*, and *Hedysarum*, there are many species distinguishable by the angles of the stem ; in *Lupinus*, the species are not to be easily known, except by the same part being simple, compound, or decompound ; in the species of *Eriocaulon*, the most remarkable difference is in the culmus, which is quinquangular, hexangular, decangular, &c. in *Tyrola*, some species are distinguished by a triquetrous scapus ; in *Citrus*, the orange (*Aurantium*) is distinguished from its congeners, by its petioles, which are winged, or increased by a membrane on each side.

The leaves exhibit the most natural, and also most elegant specific differences ; these will be amply treated of in a future number.

The fulcra are generally a good mark of distinction, and must be carefully attended to by the botanist, for the determination of the species. Thus aculie are remarkable in *Rubus* ; spines, in *Prunus* ; bractea in *Fumaria*, to which must be added the Coma, which is a bushy head composed of bractea of a larger size, and terminate the stem, as in *Lavendula* and *Salvia*.

Glandules furnish the essential mark in *Acaëia*, and other Genera, which it would be almost impossible to distinguish without being acquainted with that part. In *Amugdalus*, they are found on the serratures, at the base of the leaves, which distinguish it from *Persica* ; in *Passiflora*, on the back of the leaves ; and the species of *Urena* could never have been fixed without examining the glandules of the leaves.

*Stipulea* are of great consequence in many extensive genera, where the species are liable to confusion ; thus in *Melanthus*, they are solitary in one, and in pairs in another species.

Hybernacles afford certain specific differences. That gems or buds often differ greatly in the same genus is proved by *Rhamnus*, by the various species having all a difference in their buds ; and in that extensive and intricate genus, *salix* or willow, the species are by the structure and foliation of the buds distinguished with great certainty. Bulbs also afford real distinctions, as in *Scilla*, where they are almost the only distinction, and by their situation in the axilla of their leaves they determine *Lilium*, *Dentaria*, &c.

Inflorescence affords the truest, and in some genera the most beautiful distinction ; thus in *Spiræa*, the flowers are in some species

duplicato-racemose, in others corymbose, and in others umbellate, without which characters there would be no certainty of the species. The *peduncle* or flower-stalk, which is the foundation of the characters of inflorescence, *varies* as to the manner of its supporting the flowers, and is said to be flaccid, ~~wanting~~ firmness, *bernuos*, nodding, *Patulus*, spreading, *Teru*, coming by threes *from* the same axilla, *Articulate*, jointed, *Hexouse*, bending divers ways, *or* undulate, waved, or *Incrassate*, thickened towards the flower.

The parts of fructification often furnish most certain, and constant specific distinctions. Linnæus was once of a contrary opinion, and held, that as the flower was of short duration, and its parts commonly minute, recourse should not be had to the fructification for specific differences, till all other ways had been tried and found ineffectual; but as the fructifications contains more distinct parts than all the rest of the plant taken together, and certitude found throughout nature to depend mostly on her minuter parts, he has since readily admitted this distinction.

In *Gentiana*, the species cannot any way be distinguished, if the flower is not admitted as a specific character; but they are easily distinguished by their corollæ, which vary, in being rotate, campanulate, infundibuliform, quadrifid, quinquefid, &c.

In *Hypericum*, the species are distinguished by the flowers being *trigyndus*, or *pentagynous*.

In *Geranium*, the African species are distinguishable from their European congeners by the corolla being irregular, and also by the connexion of the stamina.

F. F. ASHFORD.

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## REVIEW.

### ARTICLE VIII.—LADIES' BOTANY, OR A FAMILIAR INTRODUCTION TO THE STUDY OF THE NATURAL SYSTEM OF BOTANY.

BY JOHN LINDLEY, PH. D. F. R. S. &c.—*Professor of Botany in the University of London.*

8vo. Cloth Boards, Plates 16s. plain; 25s. highly Coloured.

THIS little book has been written, in the hope that it may be useful as an elementary introduction to the modern method of studying systematic Botany, and in our judgment it is admirably adapted to this end. It consists of twenty-five familiar, amusing and instructive letters, each of which explains two, three, or more of the Natural Orders, forming in the whole fifty-eight. There are twenty neat

copper-plate engravings, viz. one for each letter, furnishing the figures of plants which are easily attainable either from the fields or the commonest gardens, so as to illustrate each order as it proceeds.

We were very much gratified on a perusal of the work, because it appears to us to be just what was wanted. By far the greater part of those previously written on the Natural System, (not excepting Dr. Lindley's famous "Introduction") notwithstanding their excellence and utility to the practical and experienced man, are nevertheless too complicated for those totally unacquainted with Botany, presenting at first sight to the mind of a new beginner, obstacles which appear insurmountable.

This may be illustrated by an extract from the Doctor's first letter.

"A lady, observing some ants travelling across a table, dropped a lump of sugar in the midst of them; but, to her surprise, although ants are noted sugar-eaters, they all retreated in terror from the spot, nor could any of them afterwards find courage to return to examine the object of their dread: on the contrary, they choose another track, and carefully avoided that which would have proved a treasure had they known its value. Struck by this occurrence, the lady placed the piece of sugar on a part of the table near which the ants were in the habit of crossing, and when she saw one of them approaching it, she gently placed her finger in its way, so as to obstruct his passage without alarming him; the ant paused, looked around him, and then took a new direction, not exactly towards the sugar, but near it; the lady again opposed his passage gently, and at last, by making him take a sort of zigzag direction, tacking, as it were, at every few steps, the ant was unconsciously brought to the sugar without being frightened. Once then, he examined the glittering rock attentively, touched it with his antennæ, broke off a morsel, and hastened away with it to the ant-hill; thence he presently returned at the head of a host of his comrades, by whom the rest of the sugar was quickly carried off.

So it is with science, and the young who have to acquire a knowledge of it. Let them be once alarmed at the aspect of their new pursuit, and it is almost impossible to restore their confidence; but there are few who, if led to it insensibly, will not persevere till they have made themselves masters of the subject.

The most discouraging parts of Botany to a beginner, consist either in the numerous new and strange names of which the meaning has to be learned, or in the minuteness of the parts, by which plants are distinguished from each other, or in the great multitude of species of which the vegetable kingdom consists; and it must be



confessed, that there is something seriously alarming in the mass of preliminary knowledge which, it would appear, has to be acquired before any perceptible progress can be made.

But on looking at the subject a little more closely, we find, that of the technical names employed, only a small number are really necessary in the beginning; that minute parts are little consulted in practice, however much they may be in theory; and that the arrangement of Botanists are so perfect, that no more inconvenience is experienced from the number of species, than in any other branch of Natural History."

In the present work, the study is divested of many real, and the greater part of the imaginary difficulties, and is rendered an amusing and pleasant relaxation. The great obstacle to its falling into many hands is its price, and though with all our hearts we wish it every success, we hope a cheaper edition may be devised: not that we consider this very dear, for in its present style we know not how it could be afforded much cheaper, but because we regret that any persons, and young gardeners in particular, should be deprived of so pleasing and easy a method of studying a science of so much importance to them.

The course to be pursued by those who would push their inquiries beyond the information in this book, should be of this nature. They should read some introduction to Botany, in which the modern views of structure and of vital action are well explained; (perhaps not one equals, certainly none exceeds that written by the Dr. and reviewed by us in Vol. II. p. 129 of our Hort. Reg.) they should make themselves familiar with technical terms, which, although avoided in the letters of this work, cannot be dispensed with in works of a more exact and scientific character: they may at the same time perfect themselves in a knowledge of Natural Orders, by gathering the wild plants that are within their reach, comparing them with each other, and with the characters assigned to them in scientific works.

Having thus provided themselves with a considerable amount of fundamental knowledge, they may apply themselves to the study of the Natural System in its great features. They will then, and not till then, be able to appreciate the various modifications of organization that connect one tribe of plants with another, and to understand the infinite wisdom, and beautiful simplicity of design which are so visible in the vegetable world; the just appreciation of which, through countless gradations of form, structure, and modes of existence, it should be the constant aim of the Botanist to demonstrate.

Notwithstanding all that we have advanced in favour of this work, it still appears necessary to extract a sufficient portion for a specimen

of the author's style. We have borrowed letter 3rd, on the Evening Primrose Tribe, and the Myrth Tribe of Plants.

"In the meadows and woods of Europe, North America, and the colder parts of Asia, are found a great number of herbs, which, with a great accordance in their general appearance, agree also in this remarkable circumstance, that every one of the parts of the flower consists either of four pieces or of some number which may be divided by four; in South America are many species of a similar nature, only they are shrubs, and are much more richly coloured. Botanists call these *Onagraceæ*, or the *Evening Primrose tribe*, because the charming yellow flower which unfolds its bosom to the evening sun, and drinks up the dews of night with its petals, rendering darkness as lovely as noon-day, but which retires at the approach of the sun, rolling up its petals and protecting its stamens and pistils from the glare of light, is one of the tribe; it might be called the owl of the vegetable world, only it is more beautiful and delicate than that hard-hearted enemy of mice.

If you have ever examined one of them accurately, you will be at no loss to recognise all the rest. For this purpose, suppose you take the *Shrubby Evening Primrose* (*Oenothera fruticosa*,) a beautiful little North American plant, with an absurd name, for it is not a shrub.

The leaves of this plant are of a narrow figure, not unlike the head of a lance, and their veins are disposed in a netted manner, like all the preceding; it has, therefore, a stem which increases in size by addition of matter to the outside of the wood; or in one word it is *Exogenous*; the leaves do not grow opposite each other from opposite sides of the stem, but are placed one a little above the other, so as to be *alternate*; mark this.

The flowers are of a bright yellow; and are entirely different from those of any of the preceding tribes. In the first place the calyx has a long slender tube, from the top of which arise two leaves, both turned the same way, and notched at the point; it is in reality composed of four sepals, united at the base into a tube, but capable of being separated above the tube in *four* pieces, as you may easily see if you attempt to divide it with the point of a pin.

From the top of the tube of the calyx, arise *four* petals.—Observe, again,—four,—which are of a bright yellow, and are rolled together, except in the night, when the flowers are expanded. Twice four stamens spring from the top of the tube; each has a very long anther which swings by its middle from the summit of the filament, and sheds its pollen in such way, that it looks as if it were mixed with cobweb. If

you magnify this pollen in a drop of water, each grain will be found three-cornered and held to its neighbour by excessively delicate threads; a peculiarity in the pollen which is rarely met with, except in the Evening Primrose Tribe.

The ovary is inferior, and is marked with eight ribs, of which *four* are more prominent than the others; it contains *four* cavities, in each of which is a great many seeds. The style is a long slender body, rising within the tube of the calyx, as high as the stamens, and then separating into *four* narrow stigmas.

The fruit is a dry oval case, with *four* angles, opening into *four* pieces, called VALVES.

Thus you see all the parts of this plant, from its calyx to its fruit, consist either of four or twice four parts; the like happens in all the genuine species of the same natural order; by which character they are easily known. There are many plants of very different orders, that have four sepals, or four petals, or some of their other parts, of that number; but it is only in the Evening Primrose tribe that all the parts are in fours at the same time; or some multiple of four, which is botanically the same thing.

There are no Evening Primroses, really wild, in Great Britain, however frequent they may be in gardens. But there is one exceedingly common wild flower, called Willow-Herb (*Epilobium*,) one of the species of which, called the "great hairy," is, perhaps, the most noble of all our British herbs. Its stout hairy stems grow five or six feet high, and are terminated by long clusters of bright red flowers. If you were to compare it with the description of the Evening Primrose, you would think it really must be a species of that genus, only the flowers are yellow. This, however, is not the only difference. When the fruit of the Willow-Herb is ripe, it sheds seeds, which are furnished with a curious apparatus to enable them to fly about, and spread themselves over the land: each of them has a very long tuft of silk at one end, which is so light, that the smallest breeze is sufficient to buoy it up, and raise it aloft in the air, there to be caught and carried to a great distance. Nothing of this sort is found in the Evening Primrose.

Another plant, of far greater beauty than either of the foregoing, is the Fuchsia, an American genus, for which no English name has been contrived, and which is now one of the greatest of all the foreign ornaments with which our gardens are embellished in the summer and autumn. Every body has Fuchsias; the poor weaver grows them in his window; many an industrious cottager shows them as the pride of the little plot of ground before his door; and even the

suburban inhabitants of London itself, speak of the beautiful Fuchsia they rear with enthusiasm and delight. You must, therefore, know very well what the Fuchsia plant is. Examine its flowers; on the outside of all, you have a deep crimson covering, divided into four firm sharp pointed leaves: this is the calyx. Rolled up within it, and closely embracing the stamens, are four little dark purple leaves, which are not half so long as the calyx: they are petals. The other parts you will easily recognise. But the fruit is not a hard dry case, or capsule, bursting into four valves when it is ripe; it contains four cavities indeed; but its rind is deep purple, fleshy and juicy: in a word it is a berry. This, then, is a marked distinction from other plants of the Evening Primrose tribe; but, as in all other respects, the Fuchsia agrees with them, it is not accounted sufficiently different to belong to any other Natural Order.

The Evening Primrose tribe has little, except its beauty, to render it interesting to mankind, for there is not a single species which possesses any useful property worth mentioning. Remember that number *four*, throughout all the parts of the flower, is its character; and you will be in no danger of either forgetting it or mistaking it.

I have already said, that other orders have, occasionally, four parts of the calyx, or corolla, or of some other class of organs, and yet do not belong to the Evening Primrose Tribe. I will give an instance.

You know what a Myrtle is. Take a sprig of that beautiful, but delicate evergreen, for your next subject. It has hard shining deep green leaves, which do not drop off when winter comes; but seem as if they were intended to make us forget that winter has power over vegetation: they stand *opposite* each other, and, if you bruise them, emit a fragrant aromatic odour. If you hold them against the light, you will see them look as if pierced with holes, closed up by a green transparent substance: they are not, however, pierced; but the appearance is owing to their containing a vast number of little transparent cells, in which the aromatic matter, to which they owe their fragrance, is laid up.

The flowers have a calyx of five divisions; there are five petals of a dazzling white; and from the sides of the calyx, there arises, in a ring, a very considerable number of slender white filaments, tipped by little roundish anthers.

The ovary, which is inferior, contains three cells, and a good many ovules; from its flat top springs one style, which ends in a stigma, so small that it cannot be discovered without a microscope. The fruit of the Myrtle is a purple berry, so like a Fuchsia berry on the outside that you might mistake the one for the other; but it has

only three cells, instead of four, and has a strong aromatic taste, of which the Fuchsia is entirely destitute.

You will, after reading this, ask me, perhaps, with surprise, what resemblance I can discover between the Myrtle and the Evening Primrose tribe; for it seems difficult to select two objects more unlike. I answer thus:—although the Myrtle itself is not very like an Evening Primrose, yet there are many of the Myrtle tribe, which, having only four divisions of the calyx, and four petals, might be mistaken for plants belonging to the Evening Primrose tribe, for they have an inferior berry, like that of a Fuchsia; you would, however, see that the number *four* could not be traced further than the petals, and consequently, the resemblance would cease with these parts.

The Myrtle tribe, like the last natural Order, abounds in beautiful plants: it also contains many that are of great use. The spice you call *Cloves*, consists of the young flower-buds of a tree found in the West Indies (*Caryophyllus aromaticus*;) and All-Spice is the berries of another (*Myrtus Pimenta*.) The pleasant fruits called the Rose Apple, and the Jamrosade, in the East Indies, are produced by different species of *Eugenia*; Guava Jelly is prepared from the succulent berries of trees of the Myrtle tribe, found in the West Indies; and, finally, the Pomegranate is an example of another fruit-bearing kind, which has migrated from Barbary into Europe.

All these are kinds with berries for their fruit; and they form the greatest part of the tribe. Others, however, there are which have dry fruits opening at the top, and containing a great number of very minute seeds: these, the principal parts of which are natives of New Holland, have very often also alternate leaves. It is, therefore, neither to the fruit, nor to the position of the leaves upon the stem, that you are to look for the precise character of the Myrtle tribe. The *inferior ovary, the numerous stamens, the single style, and the dotted leaves*, are what you will know it by with most certainty.

To that division of the tribe in which the fruit is dry and many-seeded belong *Melaleuca*, and *Metrosideros*, with their long tassels of silken stamens, purple, or yellow, or crimson, and so do the gigantic *Gum Trees* of New Holland (*Eucalyptus*). These last are remarkable for having no petals: and for their calyx falling off like a lid or extinguisher. I told you, in my first letter, to observe what I said about the curious calyx of *Eschscholtzia*,\* which was pushed off

\* In the *Eschscholtzia* a circumstance happens which you should not omit to note, because it seems to explain several things in other plants, which seem at first sight very puzzling. The flower of this plant, before it expands, is enclosed in a taper-pointed green sheath, shaped like a hutkin, which is pushed off by degrees as the petals unfold, and at last drops to the ground.—Letter 1, p. 22.

by the petals in the form of a hutkin, in consequence of the sepals not being capable of separating in the usual way. So is it with the Eucalyptus; its calyx has all its parts soldered together, as it were, into a hard fleshy lid; when it is time for the stamens to unfold, they push the calyx so forcibly, that it breaks away by its base, and drops off, leaving the stamens at liberty to expand as fully as may be necessary."

## MISCELLANEOUS INTELLIGENCE.

### ARTICLE IX.—QUERIES AND ANSWERS.

**LIST OF EVERGREENS, &c. FOR A SHADY WALK, WANTED.**—Would you, or any of your Correspondents, have the goodness, through the medium of your Journal, to supply me with a List of Evergreens, Flowering Shrubs, and Wild Flowers, which may be admissible in walks of a Wood Scenery, when the appearance of cultivation is desired to be suppressed as much as possible?

T: BUTLER.

P. S. Would any of the following be in keeping? Common Laurel, Laurestinus, Spanish Brooms, White and Yellow Rhododendron, Azalea, Scotch Roses, White Digitalis.

**QUERIES ON FERNS.**—The pages of your valuable *Register* have so frequently amused and instructed me upon subjects connected with every branch of Natural History, that I am anxious through its medium, to procure information upon one, which interests me much at present. A great admirer of the Order Filices, I am wishing to make an entire collection of British Ferns, and I should esteem it a great kindness, if any of your intelligent Correspondents would afford me a few hints. I am not aware of any work upon the subject:—I should be glad to know what soil is likely to suit best. What degree of moisture, shade, &c. &c. or where any collection is to be seen. I propose planting them on rock-work, somewhat after the plan at Chiswick, which will be the best season; and when the best time to search for them? A List of the Varieties, and where they are most likely to be found, would be most acceptable. I wish to make the collection myself, therefore, of course, I cannot expect to complete it for several seasons. I must plead the excuse of my being a very young Botanist for thus troubling you, and I hope the desire to assist a beginner in the study, will induce some of your able contributors to give me the information I require.

A SUBSCRIBER.

## ARTICLE X.—COLLECTIONS AND RECOLLECTIONS.

**INFLUENCE OF THE MOON.**—In considering the climate of tropical countries, the influence of the moon seems to be entirely overlooked; and surely, if the tides of the vast ocean are raised from their fathomless bed by lunar power, it is not much to assert that the tides of the atmosphere are liable to a similar influence; this much is certain, that, in the low lands of tropical countries, no attentive observer of nature will fail to witness the power exercised by the moon over the seasons, and also over animal and vegetable nature. As regards the latter, it may be stated, that there are certainly thirteen springs and thirteen autumns, in Demerara, in the year; for so many times does the sap of trees ascend to the branches and descend to the roots. For example, *wallaba* (resinous tree, common in the Demerara woods, somewhat resembling mahogany,) if cut down in the dark, a few days before the *new moon*, it is one of the most durable woods in the world for house-building, posts, &c.; in that state attempt to split it, and, with the utmost difficulty, it would be riven in the most jagged unequal manner that can be imagined; cut down another wallaba (that grew within a few yards of the former) at *full moon*, and the tree can be easily split into the finest smooth shingles of any desired thickness, or into staves for making casks; but, in this state, applied to house-building purposes, it speedily decays. Again—bamboos, as thick as a man's arm, are sometimes used for paling, &c.: if cut at the dark moon, they will invariable endure for ten or twelve years; if at full moon, they will be rotten in two or three years; thus it is with the most, if not all, the forest trees. Of the effects of the moon on animal life, very many instances could be cited. I have seen in Africa, newly-littered young perish, in a few hours, at the mothers side, if exposed to the rays of the full moon; fish become rapidly putrid, and meat, if left exposed, incurable or unpreservable by salt;—the mariner, heedlessly sleeping on the deck, becoming afflicted with nyctopia or night blindness, at times the face hideously swollen if exposed during sleep to the moon's rays, the maniac's paroxysms renewed with fearful vigour at the full and change, and the cold damp chill of the ague supervening on the ascendancy of this apparently mild yet powerful luminary. Let her influence over this earth be studied; it is more powerful than is generally known."—*Martin's History of the British Colonies.*

**INFLUENCE OF THE MOON UPON THE ATMOSPHERE.**—An astronomer at Viviers has for some time been occupied in investigations on the subject. He states, among other results, that under lunar influ-

ence the barometer rises from the period when the moon is at 135 degrees from the meridian, towards the east, the period when, having passed the meridian, it has retrograded as far as 90 degrees, towards the west;—that according to these observations, the moon weakens the barometrical pressure, so that the atmosphere would be much heavier, if the moon did not exist. The following are some further observations on this subject. During the last twenty years, the number of wet days at the new moon, was 78; at its first quarter, 88; at full moon, 82; at the last quarter, 65; at the nearest distance to the moon 96; and at the greatest distance from it, 84.—*Athenæum*.

**PREPARATION OF AZOTE OR NITROGEN.**—Take a bottle capable of containing a gallon, and fit a cork accurately to it; throw into it 22 troy drachms of green copperas, or sulphate of iron, with half a pint of water: then pour as much water on 4½ drachms of roche-lime as will slake it: and when slaked, throw it into the dissolved sulphate of iron. Cork the bottle perfectly close; and, having inverted it, immerse the neck in a vessel of water to prevent the entrance of air. By agitating this mixture briskly, during a few minutes, while immersed, the whole of oxygen present, in the common air, which the bottle had contained, will be absorbed; on removing the cork under water, a quantity of water will rush in, equal to the volume of oxygen which had been removed. The air now remaining in the bottle is pure azote: its volume is 222 cubic inches, and it may be transferred into any other vessel by filling that vessel with water, inverting it so that the mouth shall be in water, then getting the mouth of the bottle under the vessel, and turning the mouth upwards: water will enter, and azote will rise into the vessel. The quantity of sulphate of iron and lime here directed, is just double what would be required by calculation; but the process is thus hastened.—*Lardner's Cyclop. Chemistry*.

**LINNÆAN LESSONS OF BOTANY.**—By learning about a dozen terms, and being able to number as far as thirty, which every child can do, any boy or girl may, in the course of one summer, get a tolerable knowledge of two or three hundred plants, and be taught to assign these to their proper classes and orders in the system of Linnæus.

*The Twelve Main Terms of Botany.*—1. On the outside of the primrose a green sort of cup is seen, in which the coloured part stands as an egg does in an egg-cup. This, which is marked by the letter *a* in the figure, the learner may call the *flower-cup*, but botanists call it by the Greek name—*Calyx*.

2. Within this flower-cup, or *calyx*, which may be cut off to show



what it contains, is seen the coloured part of the flower,—the part, I mean, which is yellow in the primrose, blue in the violet, and red in the rose. The learner may call this coloured part the *blossom*, but botanists call it by the Latin name,—*Corolla*.

3. The blossom, or *corolla*, may now be cut off, when it will be seen in the primrose to be of one piece, while in the rose and other flowers it is of several pieces or leaves. The learner may call each of the pieces a *flower-leaf*, but botanists call it a—*Petal*.

4. Within the flower-leaf, or *petal*, in the primrose, five small bodies may be seen standing round in a circle, with little tips somewhat shaped like a barleycorn, though not nearly so large, and a slender stalk to support these. Each of the five small bodies the learner may call a *male*, but botanists call it a—*Stamen*.

5. The male part, or *stamen*, as we have seen, has two parts, the under part and an upper part. The learner may call the under part the *stalk*, but botanists call it the—*Filament*.

6. The learner may call the upper part of the male the *tip*, but botanists call it the—*Anther*.

7. When the tip, or *anther*, of the male is broken, or bursts, as it always does of itself as soon as it is ripe, a coloured powder is seen, which the learner may call the *tip-dust*, but botanists call it—*Pollen*.

8. When the calyx, the corolla, and the stamens are all cut away, the centre part of the flower alone will remain on the top of the stem. This part the learner may call the *female*, but botanists call it the—*Pistil*.

9. The female, or *pistil*, may be said to consist of a base, a middle, and a top. The base of the pistil is always more or less bulged out; and from its containing the seeds, the learner may call it the *seed-organ*, but botanists call it the—*Ovary*.

10. The middle of the pistil the learner may call the *pillar*, but botanists call it the—*Style*.

11. The top of the pistil the learner may call the *summit*, but botanists call it the—*Stigma*.

There is only one more term which I shall mention at present, and which applies to a peculiar sort of leaf, sometimes, according to the sort of plant, found on the flower-stem, often at the base of leaves, and sometimes surrounding fruits as the calyx does the corolla. This, which botanists call by more than one name, according to its situation, I shall, for the ease and convenience of the learner, call the—*Scale*.

It will make it easier for the learner to master these dozen terms to consider the several parts as placed in five circles, one within the other.

**RULES FOR COTTAGERS.**—*On saving Seeds, from Catechism of Gardening.* The only seeds that are worth the cottager's while to save are those of onion, scarlet runners, radish, and coss lettuce; as to cabbage, savoy, carrot, parsnip, &c., there is such risk in saving them true, and cost so little if bought, that the amount can be no object to the buyer. When attempted, however, the finest and truest specimens of the crop should be chosen to produce seed. A few plants of radish and lettuce may stand where they were sown; a score of the first pods may be left on the runners; and half a dozen of the best onions planted in a row on an open spot of the garden in the month of February, will yield seed enough for the following season. Indeed, saving onion seed should be a particular object with the cottager; as by having ten or twelve ounces to sell, will enable him not only to buy all his other seeds, but a load or two of dung besides.

*Quantities of Seeds required in a small Garden.*

1 pint of early peas	is enough for a row of 20 yards in length.	
1 ditto beans	ditto	27 ditto.
1 ditto runner	ditto	26 ditto.
1 ditto dwarf kidney	ditto	26 ditto.
1 ditto marrowfat peas		32 ditto.
1 oz. onion seed	sows 15 square yards; $\frac{1}{2}$ oz. leek,	7 square yards;
1 oz. carrot,	15 square yards; 1 oz. parsnip,	15 square yards; $\frac{1}{2}$ oz.
of cabbage, savoy, borecole, broccoli, cauliflower,	is enough for a seed bed of 4 square yards; $\frac{1}{2}$ oz. turnip,	11 square yards; of radishes 2 or 3 oz. for spring sowings, and $1\frac{1}{2}$ oz. for autumn. A bed of asparagus, 5 feet by 30, requires 160 plants. An acre of potatoes require from 15 to 20 bushels of sets.

The foregoing particulars will serve as a scale for apportioning other kinds of seeds, according to the size of the seeds respectively, and extent of the ground to be sowed or planted.

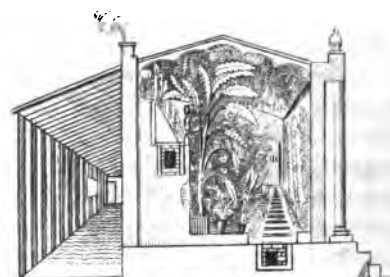
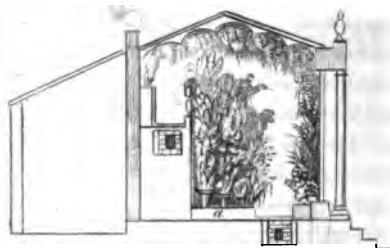
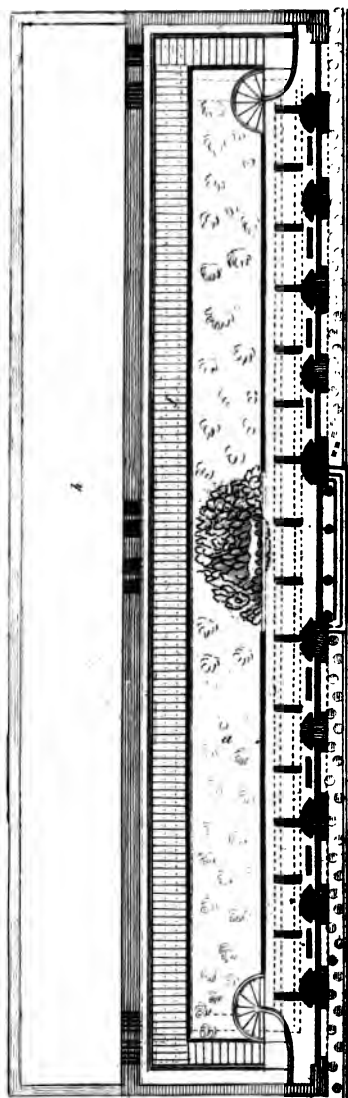
*Flowering Plants for the Cottage Garden.*

Roses and honeysuckles for the walls of the house, and for the children's flower border; tulips, narcissus, polyanthus, hyacinths, carnation, clove, picotée, pink, snowdrop, violet, Brompton and ten-week stocks, wallflowers, &c.

*Implements used in Gardens.*

The spade; shovel; two-tined and three-tined forks; hand trowel; dibbers; mattock; turnip hoe, carrot hoe, and Dutch hoe; large and small rakes; pruning knife; garden shears, and hook.





# THE HORTICULTURAL REGISTER,

MARCH 1ST, 1835.

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## HORTICULTURE.

### ARTICLE I.—REMARKS ON CELERY.

EXTRACTED FROM THE JOURNAL OF MR. H. DYSON,

*Gardener to Lady Hunloke.*

CELERY in its indigenous state is found during the summer months in shallow water, at the bottom of stagnant drains and ditches, and in other marshy places on warp, clay and bog soils. Notwithstanding there are many varieties in cultivation, in its wild state, I never discovered more than two sorts, the common red, and the white or green. That peculiar variety, *the celeriac*, I have never found in its natural state, and am therefore inclined to suspect, that it is not indigenous, yet it may abound in places unexplored by me. Its cultivation is more simple than other celery, requiring less space between the rows, by reason of the small portion of earth which suffices for soiling up, and it well deserves a more extended cultivation. Celery, in its original condition, is a destructive, rancorous poison, both to Man and Cattle, yet when the plants are removed from their native localities, and cultivated in a garden, they are divested of their poisonous qualities and become palatable, salutary and nutritious.

The Manchester gigantic Celery has long borne away the palm, and won the laurels of celebrity, throughout England, for its size, weight and quality;—how has my young heart panted to know the reason, or cause of such decided superiority! Situated between the Sea and a bleak mountain ridge, in a northern latitude, with a cold and sterile soil, what advantages can Manchester possess for the growth of Celery?—none, save and except a trifling additional supply of rain water from the clouds, by reason of its proximity to the ocean and mountain ridge. After a close and minute investigation, there appears no just reason to induce another opinion than that the well earned fame of Manchester Celery arises solely from superior

cultivation. There have been single roots of Celery exhibited in Manchester which have weighed twenty five pounds each, but let it be remarked, there was a deception practised on such roots *by loading them with white sand*,—a circumstance which ought to be recorded with all the odium attachable to such conduct. However, it is a certain fact, that roots, clean and free from all such scandalous trickery, have been shewn, weighing eighteen pounds each. During last summer, three roots, to which was awarded the first prize at the Manchester Botanical Gardens, weighed upwards of thirty pounds, on the 18th of September; and three other roots were subsequently extracted from the same row, or trench, in regular succession, which weighed forty-five pounds collectively. It is an humiliating reflection, that such described celery was grown by a paper-maker, and not by a Gardener. Whilst the culture of Celery at Manchester has attained such an high state of perfection, is it not amazing, that throughout a great part of the kingdom, roots weighing from two to three pounds, and otherwise defective, should obtain first prizes at the numerous Horticultural Exhibitions? Do not such plain truths indubitably prove a general inertness, or inaptitude for improvement in Horticulture, as contrasted with other sciences? From whence these interrogatories are extracted, others succeed, which might by possibility lead to discussion irrelevant to this subject, and are consequently withheld.

When a mere tyro, in a Gentleman's Garden, a severe rebuke received, for presuming to suggest the propriety of planting Celery in trenches less deep than those which immured every leaf of the plant beneath the level of the circumjacent earth, dwells yet fresh upon the memory. To harsh language, threats were added, *for daring to think*, yet thought revelled unconfined, although the tongue was chained by the iron hand of tyranny! and meditation urged on to experiment which fully realized my buoyant hopes, and brought conviction of the justness of my young idea.

There is a new variety of Celery, which has probably not hitherto been noticed in any gardening Periodical or other publication, designated the salmon coloured, and it certainly surpasses every other kind in size, flavour, crispness and elegance of growth. Being possessed of these desirable qualifications, it will undoubtedly soon make its way into general cultivation; although the seed for the present cannot be purchased at any seed shop; and it has been sold at a much higher rate per ounce than sterling Gold. The true salmon coloured may be distinguished from the others by the leaf stalks changing to a green colour before blanching, which is not the case with the pink or red varieties. The salmon coloured is unquestionably the best

sort in cultivation, for use from July until the end of October; at which period it succumbs to the inclemency of the weather, which about that time is generally too severe for its constitution. In November, it ought to be succeeded by a crop of the pink sort, which is very hardy, not till then in perfection, and probably is the most solid of all known varieties. In describing their distinctive colours, it may be observed, that the Salmon coloured is more grave, or sombre than the pink: and the name '*Pink*' is so truly descriptive of its peculiar tinge of colour, being lighter and livelier than the red gigantic; it is also less furrowed and therefore easily distinguished: both kinds blanch equally well.

In growing Celery, many gardeners, with a laudable but misplaced zeal of surpassing their contemporaries, use a profusion of dung, almost without any admixture of soil, in their seed Boxes, in their plant Borders, and in their Trenches to which they add liquid manure at repeated intervals; and in such cases commonly find their produce of *stunted growth*, of an *acid* taste, and ligamentous tenacity. These observations are not stated as wholly condemnatory of the use of dung in growing Celery, but to expose the fallacy of such unlimited profusion; for well sized and superior flavoured Celery may certainly be obtained without the aid of dung or other tillage, in situations where good bog soil can be procured,—for instance, say, the top spit of a good pasture. No doubt good bog soil, or good pasture on such soils, will be deemed paradoxical, by many persons in various parts of Great Britain, and yet nothing is more certain than the existence in particular localities, of good land, producing most abundant crops of grain, meadow, pasture and vegetables whose component parts are wholly bog, or peat; having received the benefits of a thorough drainage and course of tillage. In illustration of this position, we may probably be allowed a digression, to state a well authenticated fact: namely, having thrown out all the original soil of a border, to the depth of a foot or upwards, and filled the same up to its common level with Bog soil, for the purpose of growing heat shrubs, a few Cucumber seeds were accidentally strewed thereon, which struck root and grew with such intense vigour, without the slightest aid of tillage, that it became necessary to erect a temporary fence between that and another border on the south side thereof, in order to curtail its impetuous growth within some reasonable bounds; this being accomplished, the Cucumbers ascended to the summit of the fence, in some parts eight feet high, and produced, at an elevation of six feet, many large and fine fruit, the singular situation of which naturally excited considerable attraction.

For a principal crop of Celery, let the seed be sown about the beginning of March, under a frame of moderate heat, in a light compost, and when the plants have made four or six leaves, transplant them under a cold frame, in the like compost, it being about four inches deep, and placed on a hard or beaten surface. Let the plants be from five to six inches apart, in order to give an amplitude of space for both root and plant to acquire strength, previous to a final transplanting on the trenches, which must be carefully performed as hereafter directed; and let them have all the benefit of sun and air by day, and shelter by night.

To produce Celery of good quality, very large, fine and clean grown, there are several particular essentials, different in some respects to any which have hitherto been promulgated, necessary to be attended to and adopted by those Gardeners who are anxious to rival, or excel the justly famed Lancashire growers.

First, let a compost be prepared in the beginning of winter, and where practicable, let it consist of two-thirds good Bog-soil, and one-third well decomposed dung from an old hot-bed; or in case the bog-soil be poor, let the quantities be equal: let them be thrown up together, twice turned over and thoroughly incorporated, and at the last turning over, shortly before filling the trenches therewith, in neighbourhoods where good fertilizing magnesian lime can be procured, add from one to two bushels thereof to a cart load of compost; this will cause an ammonia to be given forth highly conducive to the rapid growth of the plants. Bog-soil is recommended in preference to every other, on account of its peculiar retention of moisture, as well as the facile nature of its composition, being adapted to receive and nourish the delicate and multitudinous fibres. In situations where bog-soil, or peat cannot be readily procured, let the sods of a grass sward, together with a portion of leaf mould, supply its place, to which add one-third part of dung.

Secondly, in order to grow Celery *very large*, it is indispensably necessary to abstain from and avoid those constant soilings or earthings up, which have been frequently recommended in the *Register*, and reiterated from various parts of the kingdom, and which are also in almost universal practice. This bold innovation on general management, I am aware, is calculated to excite the ire of many experienced gardeners, and to array against me a host of captious correspondents; yet no gauntlet is thrown, neither will there be any shrinking from temperate discussion. It will be asked, are we to cease blanching? Are we to grow Celery as stray and wild as a solitary Fern on inaccessible rocks? To such, and all synonymous



questions, the most decided negative is given. The process of blanching, whilst the plants are in a vigorous state of growth, may be accomplished in three weeks, but when it has nearly ceased to grow, it will require a longer time for blanching; and, therefore, when time or circumstances require, let it be earthed up from twenty-eight to thirty-eight inches high at one time, taking care the plants are free from moisture, and the soil moderately dry. With respect to its growing stray and wild, it is admitted it would do so, were no precautionary measures taken, but in three or four weeks after planting on the trenches, it will be necessary to hoe and hand-weed it; on which occasion dress off every stray leaf and stem, gather the remainder in the hand, and pass a shred of matting, or of untwisted hemp round each root, precisely at the junction of the leaves and leaf stalks, *not too tight*,—but sufficiently so to keep them in a proper upright position, and also capable of admitting the successive shoots from the centre; which will strike rapidly, and in a few weeks render it necessary to cut away the original shred, and replace it by one of larger circumference; and the second shred will subsequently require slackening, or renewing, to give room for the increasing dimensions of the plants.

Thirdly—after having set out the rows, five feet asunder, for a final planting or crop,—throw out a trench eighteen inches wide and twelve deep, laying the soil high in the centre, and sloping towards the trench, as a conductor of rain water to the roots of the plants. Fill the trench thoroughly to the top—that is—twelve to thirteen inches deep with the afore-mentioned compost, taking care to leave it moderately light;—and never tread it down with a heavy foot, if avoidable:—Just within, and on the centre range of the compost, insert the roots of the plants, with a ball of soil adhering to each, carefully arranging the numerous fibrous roots, and fixing erect with a light pressure at fifteen inches apart in the rows:—this done give a moderate watering with soft water;—and if a leaf flags, or a perceptible check in growth takes place,—say truly the work is bunglingly performed. In a short time the fibres will pour themselves like a flood into, through, and over the whole mass of compost, extracting the needful aliment for the plants, which being thus copiously supplied, shoot forth in proud luxuriance.

On close observation, in three or four weeks after the final planting on the trenches, it will be perceived, that many minute fibres have emerged out from each root, and are skimming on the surface of the compost in quest of additional food; therefore suffer not the hoe to approach nearer than a foot to each plant, but weed with the

hand if needful: and this being performed *cover those young and tender fibres* close up to the stem of the plant with about two inches deep of the compost or other light earth, to nourish them and protect them from the too powerful avidity of the Sun's rays; recollecting this is the only earthing, or soiling up that is to be applied until the final one for blanching.

The four preceding paragraphs contain the principal rules necessary to be adopted for the production of large Celery, and all directions that have been, or may hereafter be given to produce large and fine Celery weighing twelve pounds and upwards each root, merely by the force of tillage in repeated doses, with the pretended advantage of strong soil: and coupled with regular earthings up every week or oftener, are purely fallacious.

Slugs, Grubs and Worms are very apt to attack and spoil the appearance of Celery, which ought always to be sent to table clean and spotless as a Lily. To prevent their approach, give a slight sprinkling of wood ashes, or of powdered charcoal from the pits, on each side of the rows or trenches: and by using proper care, it may be produced as clean and peerless as the finest fruit.

As regards the most suitable soil, the decidedly best Celery we ever saw taken up, weighed upwards of sixteen pounds, was as clean, well blanched, and spotless as the most fastidious epicure could desire,—not even a discoloured, or perforated leaf observable in the middle of October; and was produced on a sand-soil with a sub-soil of very open, coarse sand.

The management of early and successional crops—the mode and time of watering—and many other minor and occasional attentions,—which particular situations, seasons' and circumstances may and will require to be varied, will readily suggest themselves to practical and attentive men.

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## ARTICLE II.—CULTURE OF THE OXALIS CRENATA,

BY MR. YOUNG,

*Gardener to the Earl of Enniskillen, (from the Irish Farmers and Gard. Mag.)*

THE manner of culture very much resembles that of the potatoe, with this exception, the tubers should not be planted whole, if so the plant grows strong and diffuse, causing an abundant growth of offsets from the roots, which impoverishes the plant, and extracts the necessary nourishment assigned to the formation of the tubers.

The tubers should be cut in sets, the same as is done with potatoes

and planted out in the first week in April, in drills running North and South, two feet and a half distance from each other, and the sets two feet asunder. Manure or rich ground is not required: the poorer the soil the better, as they will be very luxuriant the first five or six years.

Prepare the ground by digging it deep and breaking it fine; lay the set at the above specified distance, flat on the surface of the ground, and cover it two inches thick with fine dry sand; from this the process is the same as with potatoes: earth up with poor, dry earth, mixed with lime rubbish, such as Sorrel of every species seems to flourish in.

As soon as the blossoms have all fallen off, it is necessary to check the growth of the plants, in order to promote the swelling of the tubers. This is performed by taking the stems in the hands, turning them gently round two or three times, and fastening them in this position with bits of branches to keep them off the ground for fear of rotting, as well as to keep them from breaking, in case of high winds.

At present, they are not an early vegetable, but will become earlier in the course of five or six years. As soon as the stems begin to decay, they are fit to dig, and should be put by for use in some dry shed, and covered with straw or mats to keep the wind from them. The best way to cook them is, to put them into boiling water; and when they become a little soft, pour off the water and place some hot cinders near the lid of the saucepan, which will thoroughly do them, rendering them dry and mealy. My opinion of them is, that they will soon become a very useful vegetable, but I do not agree with the remarks in the Horticultural Register, that they will supersede the potatoe.

Product of six plants.....4lbs. 8oz.

Weight of largest Tuber.....0 1

Weight of twelve largest Tubers .....0 8

N.B. Mr. Young's observation, that the *O. crenata*, is not likely to supersede the potatoe is a very just one. 1920 grains of the root were ground up, and the farina carefully extracted; the produce was only 30 grains, while that from the same quantity of tolerably good potatoes amounted to 240 grains. This will show its inferiority as an article of food, as compared with the potatoe.—*R. P.—Ir. F. and G. Mag.*

## FLORICULTURE.

## ARTICLE III.—PLAN AND DESCRIPTION OF A PLANT STOVE,

AT CHATSWORTH,

*With some Remarks on the Management of Tropical Plants.*

THE house now appropriated to the general culture of Stove plants, at Chatsworth, of the front of which we gave a sketch in our last, page 57, was originally built for a greenhouse, to which purpose it was devoted, until 3 years ago, when the interior was remodelled, and a new glass roof was placed on it, making of it an excellent Plant Stove.

The whole length of the building is 110 feet, the breadth 16 feet 6 inches, inside the walls. The pit (*a*) on which the large plants are placed, is 7 feet wide, elevated 1 foot above the walk.

The front walk is paved with stones, and is 5 feet six inches wide; betwixt each of the front windows, is a kind of semi-circular stone bason, (*g*) extending two feet six inches from the front wall; these basons are filled with rich soil, and are planted with trailing plants, as *Thunbergia alata*, &c &c, which are trained up a trellis to the front wall.—The centre of the house is occupied with rock work, (*b*) in the front part of which is formed a basin for aquatic plants, which basin extends beneath the rock work to the back wall, where it is supplied by a tap.

There are four furnaces, two of Witty's for the front flues, and two common ones for the flues under the back elevated walk; all the flues pass into the back wall in the centre of the house, as shown by the dotted lines. The heat from the front flues is admitted through iron grates (*e*) two feet six inches long, and eight inches broad; a hot-air cavity also passes round each of the front basins, and sends heat into the house, by means of a grate opposite each of the front windows.

The back walk (*f*) is elevated 7 feet from the ground, and is ascended by a flight of eight steps. This walk is two feet six inches wide, and on the side next the wall, is an elevated border, one foot wide, chiefly appropriated to succulent plants; the hot air from the flues is admitted betwixt the bars of wood of which the walk is composed, and has on the side next the plants a neat wooden balustrade, behind which are the back sheds (*h*).

CULTURE OF STOVE PLANTS.—1. Nearly all Stove plants are easy of culture, although some possess peculiarities, which are necessary to be attended to, for their successful management.

2 All Stove plants being natives of the countries within the tropics, require as much heat, as bears some resemblance to the climate where they naturally grow.

3. The house intended for their growth, should therefore be so constructed as to give a good command of heat in the winter, when no outward helps are afforded.

4. Never allow the heat to sink below 60 in a plant stove, or for general culture above 80 degrees, but rather endeavour to keep the thermometer as near 70 degrees as it can stand, although some plants will bear a heat much greater than 80 degrees, providing humidity attends it.

5. On sunny days, when the glass has risen to 75 degrees, give air; the best situation for admitting it is either through ventilators, in the back or front walls, or by drawing down the back lights; but never give air at the doors, or in situations by which a regular draught of air would pass through the house, for this would dry the soil in the pots too much, and injure the young growing shoots.

6. Never plunge the plants in beds of tan, a system which was formerly much practised, but now nearly, or altogether exploded, because they are not found to thrive nearly so well as when placed on the surface of a prepared floor of some kind.

7. Stove plants are of two kinds, viz: dry stove plants, and damp stove plants; the general treatment of these is somewhat different. The dry stove plants include all such kinds as are succulent, and which grow in their native country, in dry exposed situations, seldom obtaining any moisture. The other kind require a humid atmosphere, and a good supply of water to their roots, when in a growing state, varying however in different plants according to their nature and habit.

8. *Dry Stove Plants*.—These may be divided into two kinds:

First, those that have a very fleshy texture, and of a shrubby habit, requiring water very seldom, and then in small quantities.—Second, herbaceous or tuberous rooted plants, which during the time of flowering will require a liberal supply of water, and at all other times require nearly the same treatment as the first kind.

9. The *first* kind includes the stove species of Cacti, Euphorbia, Mesembryanthemum, &c. &c. particulars of culture cannot be detailed here, as every genus differs more or less in habit, and so the culture must more or less vary. But as a general rule all the Cacti, Euphorbia, and plants of that kind, should be potted in loam and peat, or sandy loam, and have about a fourth part of lime rubbish added to it; and in other respects should be treated as recommended, Vol. 3,

page 217. The *Mesembryanthemum*, *Crassula*, &c. require to be potted in a good rich, light soil, and will bear a greater supply of water than the other. The manner of propagation is much the same in both; the cutting striking best when the wound made by the knife is dried up and healed.

10. The *second* kind includes the plants like *Gesneria*, *Gloxinia*, &c. The best soil for these is sandy loam and peat, with a little very rotten dung mixed. At the season of full growth, they will bear a good supply of water, but after flowering they should be moved into a cooler situation, and have a small portion of water for a week or two. Afterwards keep them quite dry, till the tops have died down; let them remain so until nearly the time for starting again, then cut off the tops, shake the roots from the soil, and plant each strong one singly in a pot, and the smaller ones two or three in a pot, filled with the above compost, and place them in the stove again.

They are propagated both by cuttings and single leaves, which may be planted either in sand or mould, plunged in heat, and be covered with a bell glass. Some of them also produce seeds.

11. *Damp Stove Plants*.—The many genera coming under this head require a little variation in their treatment, arising from habits and peculiarities of each; yet the general course of management is much the same in all.

12. The soil best suited for their growth is composed of light sandy loam, the top spit from a pasture, leaf mould, and peat, in the proportion of one half of the former, to one fourth of each of the latter, which should be thrown together from three to six months before using, that the turf may be well rotted.

13. This soil should not be sifted previous to using, but be well broken in pieces; for sifting, though necessary in some cases of plant culture, will not suit plants in general, for, by removing the fibrous particles from the soil, it sets hard in the pots and becomes uncongenial for the growth of the tender roots.

14. The usual times of potting are from the middle of March to the middle of April, and from the beginning to the end of September. But the best plan is, constantly to look through the plants, and repot all that require it, at any time; for if the roots once become matted in the pots, the plants receive a check in their growth, from which they require some time to recover.

15. In potting, always give a good drainage with broken pots, for although many plants require a liberal supply of water, yet stagnation is generally injurious. To prevent the soil from washing into the broken pots at the bottom, lay immediately over them a little of the fibrous portion of the soil.

16. Hard-baked pots are always injurious, and should, therefore, never be used; nor should any slender growing plants be placed in too large pots; as a general rule, a slender growing plant will thrive better somewhat cramped at the roots, than when overpotted. Strong growing plants requiring more room for their roots, seldom suffer from the size of the pots, provided other circumstances agree.

17. During the hot months of summer, the plants must be well supplied with water, and if they are syringed over head, not less than three times a week, in hot dry weather, and once a week at all seasons of the year, it will keep them clean, and be very conducive to their health. It is also necessary that the atmosphere of the house should be kept constantly more or less humid, this may be accomplished by throwing water on the walks and flues of the house every day.

*Propagation.*—The methods of propagation are by cuttings, layers, suckers, seeds, and divisions of the roots.

18. *Cuttings.*—No period can be definitely fixed for planting the cuttings of the different genera; this must always be left to the judgment of the cultivator. Some plants propagate freely by cuttings of the young and tender wood, as *Melastoma*, *Barleria*, *Astræa*, *Inga*, &c; others, when the wood begins to assume a brownish colour, or is half ripened as *Ixora*, *Bauhinia*, *Passiflora*, *Ruellia*, &c: whilst others will only strike freely, when the wood is perfectly ripe, as *Grevillea*, *Blakea*, *Cheirostemon*, *Achania*, &c. but as a general rule, the season lasts from January to August.

19. All hard wooded kinds make roots best in clear sand, but soft wooded kinds, require to be planted in light loamy soil. After properly draining the pots, fill them with sand or soil according to the kinds intended to be propagated. On no account mix soft wooded and hard wooded kinds together in the same pot.

20. If a hotbed frame can be appropriated to the purpose of striking the cuttings, so much the better; but if not, place them in a damp, shady part of the stove; in either place they require to be sheltered from the rays of the sun, until they have struck root.

21. Care is requisite in removing the leaves from the lower end of the cuttings that the bark be in no wise injured. Never take off more leaves than are necessary for the insertion of the cutting, nor mutilate, or shorten the remaining ones.

22. After the cuttings are put in, a gentle sprinkling of water may be given through a fine rose, to settle the soil about them; after which they may be placed in the situations where they are to strike, and be closely covered by glasses from the air until they have begun to grow,

when they may receive a little air. Water must be administered with caution.

23. When they have struck root, pot them off into small pots filled with light sandy loam and leaf mould, replace them in the frame until they have begun to grow, then gradually expose them to a more gentle temperature, and finally remove them to the stove and treat them as the old plants.

24. *Layers*.—Many sorts also strike well by layers, as *Combretum*. &c. &c. this is performed when the wood is half ripe; make an incision on the upper surface of the branch, and slightly twist it until the cut part lodges on the soil, peg it down and cover it over with the mould.

25. *Suckers*.—Many kinds are propagated this way, as *Tillandsia*, *Agave*, *Tacca*, *Strelitzia*, &c. &c. The only caution necessary to be given on this subject, is, not to remove the suckers until they have made good roots. They may be separated and treated as old plants.

26. *Seeds*.—The proper time for sowing the seeds is in February and March, but when they have been received from abroad, the best way is to sow them directly, let it be what time of the year it may. We use a gentle hotbed, and have been pretty successful in bringing up most that have reached us.

Care must be taken not to overwater the pots in which the seeds are sown, nor allow them to become on the other hand parched with drought. A good plan is to cover the pots with a little moss, which will greatly facilitate their growth, by keeping the soil somewhat damp.

27. When the seedlings are sufficiently large, transplant them into thimble pots, carefully raising each with as much soil about the roots as possible.

28. After the young plants are potted, replace them in a gentle hotbed, and shade them until they have begun to grow; then give them a little air daily, and finally remove them to the stove, and treat them as the old plants.

29. All those which grow up spindling and weak may be improved by pinching off the tops; this will induce them to throw out side shoots and become bushy plants.

30. *Division of the roots*.—The *Orchideæ*, and many other kinds, are propagated by this plan. All that is required, is to do it carefully, so as not to mutilate the roots of tender plants more than is necessary, and after potting the divided parts, to be careful not to supply with much water, until the wound has healed, or the roots are liable to rot.



## ARTICLE IV.

## CULTURE OF THE ANEMONE OR WINDFLOWER.

THERE are more than sixty species of *Anemone* known to Botanists and Gardeners, all of which are showy, and well worth cultivation.

The *A. capensis* and *tenuifolia* are greenhouse herbaceous plants, and require similar treatment to other Cape herbaceous plants; viz :

Pot them in a mixture of equal parts of light sandy loam, very rotten dung or leaf mould, sandy peat, and sand. Break and mix these well together, but do not sift them, with the exception of the dung, which should be sifted before being added to the rest

Carefully avoid overwatering them, when in a state of torpidity, but give a good supply when they are in a state of active growth, and flowering.

There are three modes of increasing these—by seeds, cuttings, and division of the roots.

*Seeds.*—Sow these early in the spring, in light soil, and plunge the pots in a gentle heat until the plants appear; then give abundance of air: afterwards transplant into single pots, and finally treat like the old plants.

*Cuttings.*—These should be taken just at the time when the flowers begin to fade: that is, about April. Plant them in the same kind of soil as mentioned above. This may be either done in pots, or otherwise. In either case, they should have a little bottom heat and be covered with glass.

*Division.*—This is performed early in the season, just before the plants begin to grow.

All the hardy herbaceous species thrive well in a light loam, and require very little care. They are readily increased by division of the roots and seeds, which some of the species produce plentifully.

Many of the herbaceous kinds are very handsome flowering plants, and deserve every attention that can be shown them.

All the tuberous-rooted kinds are propagated either by parting the roots, or by seeds. Two sorts are in particular repute, and are grown in our gardens as florist's flowers—the *A. coronaria* and *hortensis*. The former of these has broad round petals, the latter narrow and pointed ones. Both have numerous varieties: and their culture may be taken as the standard for the whole of the tuberous rooted kinds.

**CULTURE OF THE *A. HORTENSIS*.**—This species is cultivated in the same manner as the single variety of the *A. coronaria*. It is

not usually grown in beds but commonly in patches on the flower borders ; and for this purpose the seed is either sown in pots, and turned out entire, or sown in the border at once. The season for sowing, is, as soon as the seed is ripe and gathered. in preference to keeping it till spring, by which a season is lost.

POPPY, or GARLAND, ANEMONE, (*A. coronaria*).—Both the single and double varieties of this species are numerous, and common in our gardens, in which, when in flower, they are great ornaments. They are very hardy, easy of culture, and flower at almost all seasons of the year.

The history of this flower is curious. See Vol. 2, page 28.

CRITERION OF A FINE DOUBLE ANEMONE.—A perfect double Anemone should have its flower-stem from eight to nine inches in height, and of proportionate strength ; its blossom at least two inches broad : its guard leaves (outer row of petals) large, rounded, horizontal, and turning a little upwards, forming thereby a shallow cup, filled in richly with fine long petals, regularly piled one over the other (not crowded confusedly) whose colours, as well as those of the exterior leaves, should be bright, and distinctly marked in variegated flowers ; and, as it were, should be *too brilliant* for the eye to rest upon, in those that are of a single colour, which are termed self coloured.

Anemones require very similar treatment to Ranunculuses, but are much hardier.

The soil in which Anemones thrive best, is a fresh loam, rather inclined to be strong than otherwise. A small portion of very rotten dung, or leaf mould, is necessary, but scarcely so much as for the ranunculus. In preparing the bed, take out the old soil one foot deep ; lay about six inches thickness of well-rotted cow-dung at the bottom of the trench ; then obtain some good rich loam, (the top spit from a pasture,) break it well, and mix with it about a tenth or twelfth part of very rotten cow dung, at least two years old. Fill the trench with this compost to six inches above the level of the surrounding surface, sloping it on each side from the middle. This should be done not later than the beginning of October ; and, for early flowering, not later than the middle of September.

The seasons for planting are September, October, November, December, February, and March. Those planted in September will flower in the beginning of April ; those in October, will flower by the end of April ; those planted in November, flower in the middle of May : those in December, flower by the end of May ; those in February flower in the beginning of June ; those planted in March flower by the middle of June. But if it is desired to have them flowering the

whole year, plant exactly as recommended for ranunculuses Vol. 3 page 173.

The best season for planting, to ensure a good bloom, is February, because all danger is then over of their perishing by frost or excessive wet. Those planted in the autumn will be a little earlier in flower, and are sometimes as fine as can be wished. This depends, however, on the fineness of the weather during winter; for if they are not sheltered from excessive wet, or severe frosts, the roots are liable to rot.

Use long litter, in preference to rotten dung, for sheltering the roots from frost. The latter often does more injury than the frost, from which the plants are intended to be protected.

In planting, either during autumn, spring, or summer, never plant in holes made with a dibber, but either draw broad drills, or, what is far better, mark with a rod some lines across the bed, six inches apart; place the roots carefully with the crowns upwards, six inches apart in the rows: then cover them with not more than two inches thickness of light dry soil.

Never select large overgrown roots for planting in a flowering bed; they are usually hollow, and often decayed in the inside, and seldom flower well, sometimes not at all; but choose roots of a moderate size rather fresh and plump.

It is indispensable that no raw turf be in the soil of the bed, for if the roots come in contact with it, they will not grow well.

When the leaves appear above ground, choose a dry day to press the soil firmly about the roots, which is best done with the hand, for, if the weather proves dry, the crowns of the roots, if exposed, will be injured.

If the weather be dry through April or May, the beds will require watering; and this must be continued, as often as necessary, until they are in full bloom.

In all situations where the sun has great power, the beds will require shading, or the leaves will become yellow, and but few flowers will be produced. When they come into flower, shading is always necessary, or the rays of the sun will affect the brilliancy of the flowers, and the growth of the roots; but no shading should be nearer the ground than a foot and a half, nor must it prevent a free current of air passing under it, or the stems will be weakly. It must, also, be so fixed, that it may be rolled up morning and evening, to allow the plants to receive a little sun, or the colours will be pale. But if the cultivator is not particular about the colours running a little, shading need not be resorted to at all, except in excessively dry hot weather.

Never allow the roots to remain in the ground after the herbage is dead. It continues in growth much longer after flowering than the ranunculus, which no doubt arises from the more succulent nature of the roots.

If the weather be wet, after the plants have done flowering, still allow the covering to remain over the bed, to prevent the roots from absorbing too much moisture : or the foliage will not die down at the usual time, nor do the roots attempt to ripen, but often strike roots again, and thus become much weakened.

If it is necessary to shelter the beds from excessive rains, yet the plants must have as much sunshine as can be given them, or the roots will not be fine and plump.

When the roots are taken up, cut off their dead stems nearly close to the root; spread them in a shady, but airy room, to dry gradually, and frequently turn them ; or they are liable to mould.

When they are about half dry, clean and separate the dirt from them. This must be done with great care, as are they very brittle, much more so than ranunculuses ; and should any pieces be broken off in the operation, these must be preserved and planted by themselves ; for they will all make flowering plants, if they possess eyes, which will very probable be the case.

In about a month after the roots are taken up, separate the offsets from them ; this is a far better time than either at the time of cleaning or planting : for in the first case the smaller offsets, by being separated so early, become very shrivelled, and the larger ones lose their plumpness ; and if separated at the time of planting, the wounds of neither the parent root, nor the offsets, have time to heal, and the roots are, therefore, liable to perish in the ground.

When dry, put them in bags or boxes, exactly as recommended for ranunculuses, Vol.3, page 174.

*Propagation by Seeds.*—Select well formed and brilliant coloured single or semidouble flowers from which to collect the seed. The greater part of the plants grown from seeds, will of course prove single, but a few very good ones may be expected.

Gather the seed every day as it ripens, and when a quantity is gathered, sow it immediately. This may be done either on a bed, or in pans and boxes ; if in either of the latter, give a good drainage, and let the soil be a mixture of light loam and leaf mould.

The downy substance with which Anemone seed is enveloped, renders it difficult to be sown in a regular manner. To remedy this, it is necessary to mix a quantity of fine sand with the seed at the time of sowing, which if well rubbed with it, will prevent it falling on the bed in lumps.

If sown in pots or pans, treat them exactly in the same manner as recommended for seedling ranunculuses Vol. 3, page 175. But if sown on a bed, little attention is required, except to shelter the bed a little during winter, and allow them to remain until they flower; top-dressing when they require it, by sifting a thin layer of good rich soil over the bed, having previously loosened the surface of the bed for the purpose. After they have flowered, the roots may be taken up, and planted in the borders or on beds, and treated as old roots.

## ARTICLE V.—NEW AND RARE PLANTS,

FIGURED IN THE PERIODICALS FOR FEBRUARY.

### CLASS I.—PLANTS WITH TWO COTYLEDONES, OR SEED-LEAVES.

#### THE PEA TRIBE, (LEGUMINOSÆ.)

**VICIA POLYSPERMA**, Many-seeded Vetch. This is a perennial, very like our native *V. sylvatica*, indeed its characters are hardly marked enough to separate it. Professor Tenmore discovered it in a wood on the road to Bagnuoli, in the kingdom of Naples. It should be planted in a gravelly loam, and is easily multiplied by seeds, which it perfects abundantly, and which should be sown when the plant is intended to remain, as few of *Leguminosæ* bear to be disturbed when once planted.—*Don in Brit. Fl. Gard.*

#### THE HEATH TRIBE (ERICEÆ)

**DABÆCIA POLIFOLIA alba**, White-flowered Irish Heath. This beautiful variety was gathered in the county of Mayo, by Mr. J. T. Mackay, in 1832. It requires a peat soil, and is easily propagated by layers and cuttings,—*Don in Brit. Fl. Gard.*

#### THE BORAGE TRIBE (BORGINÆ)

**LITHOSPERMUM ROSMARINIFOLIUM**, Rosemary-leaved Gromwell. A native of the south of Italy. It is a beautiful, half shrubby, and highly interesting species, and one of the best adapted for rock-work in a mild climate. It appears to require no particular care in the management, except to be protected from the wet in winter. The blue of the flowers is of the most intense and brilliant tint. Probably may be propagated by cuttings.—*Dr. Lindley in Bot. Reg.*

#### THE FIGWORT TRIBE (SCROPHULARINÆ.)

**CHELONE CENTRANTHIFOLIA**, Valerian leaved Chelone. A new hardy herbaceous plant, related to *Chelone barbata*. It is a species of considerable beauty, growing well in any soil or situation, if exposed to the sun: but best adapted to planting amongst American plants. A native of California, whence it was sent by Mr. David Douglas.—*Dr. Lindley in Bot. Reg.*

## THE BELL-FLOWER TRIBE, (CAMPANULACEÆ.)

**CAMPANULA FRAGILIS** *hirsuta*, Hairy-leaved brittle Bell-flower. A native of the southern parts of Italy, where it is said to be one of the most lovely objects imaginable. It grows in exceedingly dense tufts, hanging down from the face of limestone rocks; and flowering in the summer months. It is a perennial plant, for which it will be difficult to find in this country the same combination of the mild dry air, the limestone rocks, and sunny skies of Naples. It will very likely require to be treated as a greenhouse or delicate frame plant in winter; and no doubt the greatest precaution will be required to prevent its damping off.—*Dr. Lindley in Bot. Reg.*

## THE HOUSELEEK TRIBE (CRASSULACEÆ.)

**SEMPERVIVUM URBICUM**, City Houseleek. A greenhouse plant with a large pyramidal spike of yellow flowers, found commonly on rocks and the roofs of houses, in Teneriffe, in inland parts of the Island, where the air is damper than in the valleys. It flowers in the months of December, January, and February; and is one of the handsomest of the shrubby species of this interesting genus. It may be procured of Messrs. Young and Penny, of Milford.—*Dr. Lindley in Bot. Reg.*

## THE NIGHTSHADE TRIBE (SOLANÆÆ.)

**SOLANUM TWEEDIANUM**, Mr. Tweedie's Solanum. Among the numerous species of Solanum received at the Glasgow Botanic Garden, from Mr. Tweedie, which he gathered near Buenos Ayres, is the present one. It flowered in the greenhouse in the month of October; the flowers are of a purplish white colour, with the projecting stamens of a full orange.—*Bot. Mag.*

## THE MINT TRIBE (LABIATÆÆ.)

**PHYSOSTEGIA IMBRICATA**, Imbricated Physostegia. This species inhabits Texas, whence roots were sent to Glasgow, and probably to the other Botanic Gardens in this country, by Mr. Drummond. Its flowers are purple rose colour, and appear during the latter end of the summer and the autumn. The plant is a hardy perennial.—*Bot. Mag.*

## CLASS 2.—PLANTS WITH ONE COTYLEDON, (OR SEED-LEAF.)

THE LILY TRIBE (LILIACEÆ, *decand.* HEMEROCALLIDÆÆ, *brown.*)

**FUNKIA LANCIFOLIA**, Lance leaved Funkia. An interesting addition to our hardy flowers, from Japan, whence it was introduced last year, by Mr. Knight, King's Road, Chelsea. The flowers are purple.—*Don in Brit. Fl. Gard.*

## THE ORCHIS TRIBE (ORCHIDÆÆ.)

**MONOCANTHUS DISCOLOR**, Dingey Monk-flower. A very rare

plant in Demarara, whence Mr. Bateman received a single bulb by his collector, Mr. Colley. Although not handsome, this is an interesting plant, as confirming the genus *Monacanthus*, which before consisted of but a single species found in the Brazils.—*Dr. Lindley in Bot. Reg.*

GROBYA AMHERSTIÆ, Lady Amherst's Grobya. This curious species was sent from Brazil, by Mr. Hayne, in 1829. It flowered for the first time in September last, at Montreal, in the collection of the Countess Amherst.—*Dr. Lindley in Bot. Reg.*

## ARTICLE VI.

### DESCRIPTION OF VARIOUS MODES OF HEATING BY STEAM, FOR HORTICULTURAL PURPOSES.

BY MR. HENRY STOTHERT, CIVIL ENGINEER, BATH.

*Extracted from the London Horticultural Society's Transactions.—Vol. 1, New Series, Part 3.*

FOR PINE PITS.—Figs 5 and 6, represent a mode of obtaining bottom heat by means of a cistern of water heated by small steam pipes, which are introduced near the bottom, leaving only sufficient drainage to take away the condensed water. The

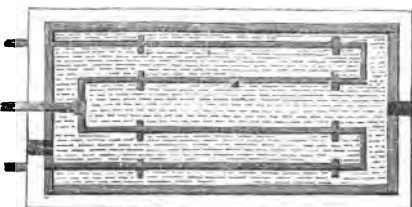
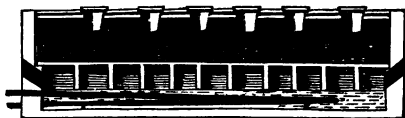
depth of the water in the cistern is about one foot, which is warmed generally about twice a day, by means of two one-inch steam pipes, each

going to the further end of the cistern, and returning again in the opposite direction, as shewn in the sketch ; by

this means the heat is very equally distributed. At each end of the cistern, a small passage is left for the purpose of

ascertaining the temperature of the water, and which will, if left open, admit considerable humidity to the house or pit.

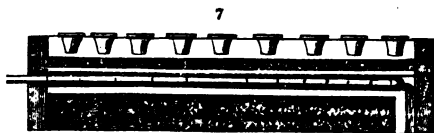
Across the cistern are laid joists, which support a paving of stone or brick, laid without mortar, on which is placed a bed of broken stones or bricks, about one foot in thickness, which towards the top are about the size commonly used for macadamizing the public roads; this is again covered with a bed of ashes, in which the pots, are placed, as in the usual way.



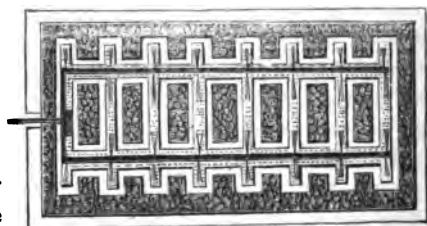
In lieu of the paving on the joists, boards, hurdles, or any other material capable of supporting the weight above, is equally applicable. This mode has been in successful practice, nearly four years, in the garden of Mr. Sturge, of Lambridge, near Bath, who considers it greatly superior to the use of either dung, leaves or tan, &c.; the temperature being at all times under the absolute controul of the attendant.

This mode seems to have originated with Mr. Sturge, I having heard of no other person using it previously to his trying the experiment.

**FOR BULBS, CACTI, &c.**—Figs. 7 and 8 represent an elevation and plan exhibiting the mode in which bottom-heat is applied to stoves for bulbs, cacti, &c. by the agency of steam. A paved water-tight bottom heat being built on stones,



earth, or any suitable support, with a declivity towards any convenient part of about one inch in ten feet to allow of drainage; channels are formed about three inches deep, and the same width, crossing each other, as shewn in figure 8, which also represents two small steam pipes, each three quarters of an inch in diameter, closed at the further end, and having perforations about one tenth of an inch diameter opposite each other, and in the middle of the channels.



The result is, that when steam is admitted into the pipes, it is discharged in opposite directions, through the orifices, filling the whole space of the channels with hot vapour; the channels being covered with brick or stone, jointed without mortar, as shewn in fig. 7; the vapour which percolates between the joints, is arrested by a bed of stones or broken bricks, similar to those used in fig. 5, and about fourteen inches in depth above the paved bottom; on this again is placed a bed of sand about one foot deep, in which the pots are plunged to any suitable depth.

The vapour is so completely arrested by the strata of stones, &c. and sand, beneath the pots, as to communicate a heat congenial with the health of the plants, without the least excess of moisture.



FOR MELON PITS, &c.—Fig. 9, represents a mode of applying bottom-heat to a Melon pit, adopted by Mr. Sturge, of Bath. In this arrangement, a hollow chamber is formed over the bed of stones, &c. that cover the steam pipes, the arrangement of the paved bottom, steam pipes, channels, &c. being in all respects similar to that described in Figs. 7 and 8. Immediately over the bed

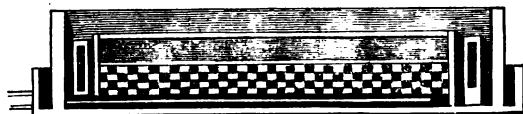


of stones are laid joists, supporting a paved bottom jointed without mortar, on which is placed another bed of stones, &c. about eight inches thick, and on this the mould containing the plants.

The objects of this arrangement are first, to obtain a perfect uniformity of temperature, and secondly, to prevent the possibility of any of the roots receiving injury from heat, should they accidentally strike through the mould into the bed of stones; both of which objects are perfectly attained.

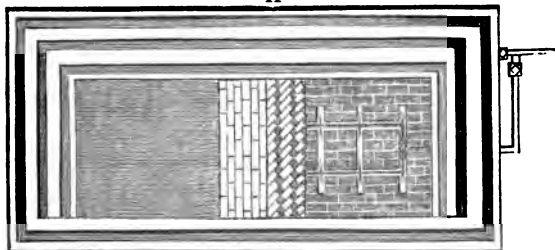
Figs. 10 and 11 represent an elevation and plan of a Melon Pit, erected for W. W. Salmon, Esq. at Devises. Shewing also the mode

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of heating the atmosphere of the pit, the arrangement of the steam-pipes, paved bottom channels for vapour, &c. are precisely the same

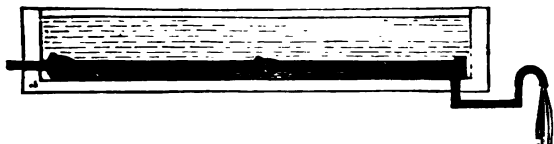
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as above described, but in lieu of beds of broken stones, &c. bricks are here placed edge-wise, one over the other, four deep, arranged in the same manner as for burning a kiln, over which is laid a flat cover jointed close without mortar, and on this the mould containing the plants.

**FOR AQUATIC PLANTS.**—Fig. 12, shews a mode of warming a cistern or reservoir of water for the preservation of Aquatic Plants, as erected at Mr. Miller's Nursery, at Clifton, in front of one of the green-houses, and having a glass roof. Steam is admitted by a pipe three

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quarters of an inch diameter, having perforations of about one tenth of an inch at each foot in length, the extremity of the pipe being closed, and it issues through the small apertures, filling the whole internal area of the large pipe in which it is enclosed; imparting an equable temperature to the whole extent of surface; an effect which cannot be obtained by applying steam in the common way, when but a small increase of temperature is required; as the water immediately in contact with the pipe where the steam is admitted would absorb nearly the whole of its heat, till it arrived at a temperature far beyond what could be allowed in a case of this kind. The dimensions of the reservoir alluded to, are about three feet by three feet six inches, and twenty feet long. The external pipe four inches inside diameter, the condensed water from which is taken away by a small syphon at the further end.

## RURAL AFFAIRS.

### ARTICLE VII.—ON THE CIRCULAR SAW.

BY MR. E. MURPHY.

*(Given in Answer to our Correspondent in the Irish Farmers' and Gardeners' Magazine.)*

I PERCEIVE that I am called upon, by a Correspondent, (Vol. 3, p. 488,) for an account of the Circular Saw-Mill, which I observed at Dunkeld, and with the construction of which I professed myself so much pleased;—the object of the enquirer being to have a circular saw erected in the farm-yard.

Perhaps the most likely way to meet his wishes, will be to describe the machinery of a very complete circular saw-mill, which I had lately an opportunity of observing, at Glenmore, in the county of Wicklow, the property of — Synge, Esq.

The Water-wheel by which the whole is worked, is thirteen feet in diameter, by three feet in width;—the water enters the buckets

from above (overshot). A metal wheel is fastened to the exterior rim of the water-wheel, in which the cogs are two inches apart, and by which a pinion wheel, three feet in diameter, and having forty-cogs, is worked.

On the other end of the axle of this pinion, which may be of any required length, and which in this case is in the interior of the building, a mitre wheel, of the same diameter of the pinion, viz.—three feet, is attached, and this works a small wheel of sixteen inches diameter, with thirty two cogs, which is staked or fastened on the axle that supports the two drums.

The drums are each four feet in diameter, and a leathern strap of three inches in width, works over them, and over a block or chieve, which is attached to the end of the axle on which the circular-saw is staked; a block of one foot in diameter and three inches broad, works a saw three feet in diameter. Two circular saws are worked by each of these two drums, and the quantity of stuff they are capable of cutting is quite astonishing. An idea of their power will be given, by stating that we had a cut run through the whole centre of a larch tree, thirty feet in length, and six inches in diameter, at the ground, in the short space of one minute and twenty seconds.

Mr. Ward, the intelligent forester at Glenmore Castle, informed us, that he has had thirty three perches of twenty one feet pailing, for folding sheep, made by six men in a single day.

Mr. Dee (Vol. 3, p. 488) is therefore, perfectly correct, when he states that the value of a circular saw in economising labour in the farm-yard would be very great indeed.

Small circular saws are frequently worked in the manner that lathes are, by a strap or rope round a wheel, motion being communicated either by the foot, or by an additional man, but such do not possess much power; the better way is to drive the saw by means of a drum attached to some quickly revolving axle of a corn-mill, steam-engine, or thrashing machine.

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## NATURAL HISTORY.

### ARTICLE VIII.—ON THE DISTINCTION OF VARIETIES OF PLANTS,

BY MR. F. F. ASHFORD.

THE collecting of varieties under their proper species is a work no less necessary than that of collecting the several species under their proper genus. Such differences as are only incidental to vegetables, and are not found constant and unchangeable in them, are to be

considered as varieties only. These varieties are chiefly grounded on the following circumstances; viz. Magnitude, Time of Flowering, Colour, Scent, Taste, Virtues and Uses, Duration, Multitude, Pubescence, Leaves, and Monstrous.

1. *Magnitude* is no specific difference, but a variety, being liable to alteration from the soil or climate.

2. *Time of Flowering* is a treacherous mark of a distinct species, and unless supported by other distinctions, can only be considered as a variety.

3. *Colour* is found so changeable in the same species, that it must be considered as a variety only. In flowers, the colour is most variable, the most usual change being from blue, or red, to white. Fruits are observed to change their colour as they ripen, the pericarpium, when it is a berry, changing from green to red, and from red to white, and in ripe fruits, the colour, either white, red, or blue, admits of variation, as in *Pyrus*. Seeds very rarely vary in their colour, though there are instances, as in *Papaver*. Roots are also a little subject to alteration in colour, yet a variation is observed in the roots of *Daucus*, and *Raphorus* leaves are rarely found to quit their green, but they are coloured in *Amaranthus*, and frequently become spotted, as in *Orchis*. The whole plant is often found to vary in its colour, as in *Artemisia*,

4. *Scent* is of all other circumstances, the least to be depended upon and, therefore, all species grounded on a distinction in the scent only, are to be rejected, and referred to varieties.

5. *Taste* is a circumstance variable from soil, or culture, and not to be depended upon as a real difference. The distinctions of gardeners in fruit of the same species is considered by Linnæus as a variety too minute even to enter the province of Botany, and therefore the various names given to these distinctions are to be neglected as impertinent to the science, though for the purposes of gardening they have their use.

6. *Virtues and Uses* furnish no specific differences, and their distinctions of physical writers are not always to be depended on.

7. *Duration* is no sure mark of a distinct species, being often owing rather to the place than to the nature of the plant; in warm regions, plants that are annual with us, will become perennial or arborescent, and on the contrary, cold regions will occasion perennial plants to become annual.

8. *Multitude* or quantity is an accidental circumstance in plants, and cannot conclude any thing, whether the increase be of the plant itself, or of its roots, stem, leaves, or fructification:

9. *Pubescence* is an uncertain mark, as by culture or change of soil plants are subject to lose their spines, as their hair or down.

10. *Leaves*, though for the most part they furnish most elegant specific differences, are yet subject to luxuriation in the same species, which must be carefully distinguished; this may respect their opposition and composition, and also their being crisp, or bullate.

a. In respect to opposition, opposite leaves will sometimes become tern quatern, or quine, growing by threes, fours, or fives, and then the stem also from quadrangular (square) will become polygynous (of many sides.)

b. In respect to composition, digitate leaves will frequently gain an addition of one or more folioles.

c. Crisp or curled leaves are a frequent variety, there is a singularity observable in scented plants, that when the leaves are curled, the scent is heightened by the crispature.

d. Bullate or bladdery leaves are generally produced from those that are rugose (wrinkled,) and this is owing to the increase of the substance of the leaf within its vessels, which occasions it to swell and rise.

Plants are sometimes found to vary from broad leaved (*latifolia*) to narrow leaved (*angustifolia*) but this variation is less frequent.

11. *Monstrous* flowers, such as are multiplicate, full, or prolific, derive their origin from natural ones, and therefore are only to be considered as a variety.

Upon the whole, the change of soil is found to have a great effect on the nature of plants, and to this many of the varieties above mentioned must be imputed. In like manner, the improvements which are made in the plants cultivated for fruit, as in *Vitis*, *Pyrus*, &c. and in all kinds of grain and pulse, are not to be esteemed as lasting, for all these, if left to themselves in a poor soil, would run off again, and resume the qualities they had when they grew wild. The soil also has some effect upon the leaves, for though it is less common for them to differ on the same plant, yet it is observed that watery soils are apt to produce a division in the lower leaves of the plant, and even to render capillary such as are produced under the water; and on the contrary, that montaneous plants usually have their upper leaves more divided, their lower ones more entire. Varieties may generally be explained and reduced under their proper species with ease, by conferring the variable marks of the variety with the natural plant. The whole order of th/ fungi, to the scandal of the science, is still a chaos, botanists not being able to decide with certainty what is a species or which is a variety. On the different forms of roots and leaves, in my next.

## ARTICLE IX.

OBSERVATIONS ON THE BLOOD-LIKE PHENOMENA, OBSERVED  
IN EGYPT, ARABIA, AND SIBERIA,

WITH A VIEW AND CRITIQUE OF THE EARLY ACCOUNTS OF SIMILAR APPEARANCES.

BY MR. C. G. EHRENBERG.

*Extracted from Jameson's Philosophical Journal.*

IN 1826, Professor Fr. Nees Van Esenbeck the brother of the president, observed an infusory animal as the colouring material of red water, in a vessel of the botanical garden at Bonn, and which, in Kartner's Arch. VII. p. 116, he, along with Goldfuss, his fellow-observer, called *Enchelys sanguinea*. It appeared that the colour of the body of the animal was produced by an internal brown-red granular mass; that the extremities of the body were transparent, the hinder pointed, and the fore-part rounded. These accounts sufficiently shew that the animal has a similar form with the *Cercuria viridis* of Muller, though the observers say nothing either of the presence or absence of the important dark point in the forepart of the animal, which Nitsch correctly considers as an eye, and which constitutes the specific character of the genus. Weber, at Halle, found this point in his red animals, hence there remains no doubt as to the genus. Whether the volvox of Girod Chantran be one and the same, with *Enchelys sanguinea* has not been determined.

The colouring of water by means of *Oscillatoria major*, or by a species having a close affinity to it, has been very recently made known to me, and that species has received from Bory St. Vincent the name of *Oscillatoria Mougeotii*.

To the series of observations now concluded, I annex an observation which I made in 1821 and 1823, at Cairo in Egypt. In the months of January and February, I found, in the garden of Mr. de Rosetti, on the soil of a place exposed to the morning sun, large spots of from 4 to 6 inches, and of different shapes. These spots seemed so very like clotted blood, that I frequently passed them without being tempted to examine them more closely. The remarkable circumstance of blood being in this part of the garden, at length excited my attention by its abundance, and looking at it again, I took up some of it from the ground with my knife, and soon perceived on the delicately wrinkled surface that it was not blood, but a fungus. The *Thelephora sanguinea* was not known to me; therefore I separated a portion of the mass from the soil, to add it to our collection of plants.

On the following day I had leisure microscopically to examine and delineate the fresh plants which I collected from the originals, and will publish in the *Symboli Physici*. The *Thelephora sanguinea*, which is accurately distinguished from the other *Thelephoræ* as a *Palmella*, but has been inaccurately placed among the *Algæ*, is distinguished by a real peridium (a firm epidermis) which is entirely wanting in the Egyptian form, which consequently appeared to be of a gelatinous nature. I have described it as a particular genus, and called it *Sarcoderma sanguinea*.

**SARCODERMA.**—Char. Gen. *Thallus gelatinosus rugulosus granulis discretis repletus nec fibrous nec epidermide (peridis) instructus*. The *Nostocinen Algæ* have a peridium.

Another kind, the *Geocharis nilotica*, rather of a cinnabar than a blood-red, though of a very lively colour, is universally prevalent in Egypt, on the wet banks of the Nile, where *Riccia glauca* grows. It is a very remarkable kind of small mushroom, having a very close affinity to the *Vaucheria granulata* of Lyngby, or the *V. radicata* of Agardh; but, notwithstanding this, it certainly belongs to the fungi and not to the algæ.

*Geocharis*. Char. gen. *Thallus tubulosus continuus teres filiformis (radiciformis)*. *Vesiculæ fructus externæ inflatæ (Coniocystæ) sporangüs, sporangüs sporidia colorata includentibus repletæ*.

In the same year, I found at Siut in Upper Egypt, after the inundation of the Nile, a stagnant water of a very red colour. The colouring body was the *Sphæroplea annulina* of Agardh, a well-known alga of fresh water.

In 1823, I was for a number of months at Tor, on the Red Sea, in the vicinity of Mount Sinai. On the 10th of December I there observed the striking phenomenon of the whole bay, which forms the harbour of Tor, of a bloody colour. The main sea beyond the coral reef that encloses the harbour, was as usual colourless. The short waves of the calm sea during sunshine, carried to the shore a blood-coloured slimy mass, which it deposited on the sands, so that the whole bay, fully half a league in length at the ebb of the tide, exhibited a blood red border of more than a foot broad: I took up some of the water itself with glasses, and carried it to my tent at hand on the sea-shore. It was immediately discovered that the colouring was caused by small flakes scarcely distinguishable, often greenish, sometimes of a lively green, but for the most part of a dark-red colour, although the water itself was not stained by them. This very interesting appearance attracted my attention as explanatory of the name of the Red Sea, a name hitherto so difficult of explanation. I for

many days, and with perfect leisure, accurately examined the appearance, and made microscopical observations on the colouring mass. The flakes consisted of small spiral, or longish irregular bunches of oscillatoriæ threads, which were enclosed in a gelatinous sheath, and the flakes neither resembled one another nor the threads in each flake. In the glasses placed besides me, I observed that the flakes, during the heat of the day and in sunshine, floated together on the surface of the water. During the night, and when the glasses were shaken, they descended to the bottom. After some time they returned to the surface. The observation made by Dr. Engelhardt on Lake Murtten, was very similar to this appearance, and the delineation of the single threads by De. Candolle, informs me he has preserved no dried specimen of that substance, for which reason no comparison can be made. The gelatinous covering, and the union of many threads into very small spiral groups, give to the substance of the red sea a peculiar character, which entitles it to form a particular genus of alga.

*Trichodesmium erythreum*. Char. gen. Fila septata fasciculata nec oscillantia, fasciculi discreti muco involuti sociales libere natantes. I know a very similar green body, which I have often observed at Leipzig and Berlin, and which entirely fills the water, giving it a greenish hue. I call it *Trichodesmium flos aqua*, because I do not find it enumerated among the commonly mentioned forms of this kind.

The appearance of the Red Sea was not permanent but periodical. I observed it four times, viz. on the 25th and 30th of December 1823, and on the 5th January 1824. We brought along with us for the Royal Collection specimens taken from the sea shore, and dried on paper and sand. More particular details in regard to it will be found in the *Symboli Physici* of Dr. Hemprick's journey and my own.

In 1829, I had an opportunity in Siberia of making my most recent observations on blood-red water. In the steppe of Platow, between Barnaul and the lake of Koliwan, on the 24th July (5th August, O. S.,) while intending to take a survey of the vegetation of the steppe, I found a fen with a pool of water, in a low land in the immediate vicinity of the poststation. The dark blood-red colour of the water was very striking, even at a distance. I therefore during breakfast made an excursion to the place of the phenomenon. I found that the colour was confined to a slimy surface, which in different places formed a shining skin. In some places the water was troubled with red colouring matter, which in many places passed into a greenish hue.

The red colour was darkest on the edge of the marsh. In some spots, indeed, it formed a red jelly, because the water began entirely



to evaporate, leaving nothing but slime upon the mud. The main design of our journey, and the rapidity with which we travelled, prevented me from making microscopic observations on the spot itself, but I collected the red mass partly on white paper, drying it quickly in the sun, and partly in glass bottles; and to make certain of preserving some of it fresh, I took with me some of the mud of the fen coloured with this matter, hoping on the one hand, that the mud would for a long time preserve the moisture, and, on the other hand, that the small and very probably organic particles of colouring, would remain in it undisturbed, and not be destroyed by the jolting motion of the waggon.

In Schlangenbergl, where we stopped longer, on the following day, 25th July (6th August O. S.), and on the 27th July (8th August, O. S.), I had sufficient leisure to examine the substance repeatedly with the microscope, and to make a drawing of it. The corpusula in the mud only were preserved alive, and the microscope immediately shewed that the colouring particles were infusoria, nearly related to the proteal forms of the *Cercaria viridis* of Muller, which I have placed in a new genus *Euglena*, but they were not, like these, supplied with eyes, for which reason I have assigned them a new generic name, *Astasia*, from the changeableness of their form. Bory de St. Vincent has indeed formed a genus *Raphanella*, in which he has included similar forms, and likewise the *Cercaria viridis*; but I omit this name, first bestowed by him from the form of the animal, which is Muller's *Proteus tenax*. The remaining forms, which are quite differently organized, belong to other genera, and partly to other classes. I shall give a coloured drawing of this beautiful animalcule, done from life upon the spot, in the notices which I intend publishing of that journey, but I shall here be satisfied to make myself intelligible by a short characteristic of it.

*Astasia*, *Phytozoa rotatoria*. *Monotrocha*? Char. Gen. *Corpus varium caudatum aut postice acuminatum, ore antico, cilium non distinctis, oculo nullo.*

It is very probable that this animalcule, which I call *Astasia hæmatodes*, is one and the same with the *Volvox lacustris* of Girod Chantran, but which seems to be still less changeable in its forms, thence in the mean time be retained as *Astasia lacustris*. A third form is probably the *Astasia sanguinea*, the *Enchelys sanguinea* of Nees and Goldfuss. The structure of this animal has a close affinity to the genus *Euglena*, (*Cercaria viridis*) that is furnished with an eye, which explains the circumstance why no propagation by division has been observed among them, as is the case in the character of the

class of rotiferous or wheel animals. I am acquainted with four distinct species of the genus *Euglena*: *E. viridis*, *Cerc. pleuronectes*, *M.*; and a new species, *E. spirogyra*.

Weber's animalcule may form a fifth species, as *Euglena sanguinea*. No more zoological particulars belong to this place.

I close the enumeration of my observations with the information, that during this year at Berlin, the alga form *Sphæroplea annulina*, in the lowlands at Kreutzberg towards Schonberg, the flooded fields at the end of May appeared of a most beautiful orange-colour, which passed into a lively cinnabar, to an extent which I had never before witnessed. This algaform is first green, hence the *Sphæroplea sericea* of Agardh refers to the colour, which was occasioned by Bory de St. Vincent's *Cadmus sericeus*, which is just the earlier state of the same plant.

A retrospect of all the facts regarding bodies which really or apparently communicate a red or blood-like colour to waters and aqueous meteors, affords us the following catalogue of them.

A: Blood-dew, Red-dew, Blood-rain, and Red-rain.

I. Are decidedly shewn to be a deception caused

1. By an excretion from bees.
2. from butterflies:
3. By red atmospheric dust.

II. Are probably sometimes effects of chemical processes, producing red rain and red dew, but no particular instances supported by positive and undeniable proof have been adduced by any one.

B. Stagnant red waters (blood water,) Red springs, Red Sea-water.

I. Are shewn to be an illusion produced by

#### a, ANIMAL BODIES.

- |  |  |
|--|--|
| 4. Great numbers of <i>Entomostraca</i> ,..... | } of <i>Daphnia pulex</i> .<br>of <i>Cyclops quadricornis</i> .  |
| 5. Great numbers.....                          |  |
| 6. ....  | } indefinitely minute <i>Akalephæ</i> ?<br>in the sea.   |
| 7. ....  |  |
| 8. Great numbers.....                          | } of <i>Euglena sanguinea</i> (Weber's<br>infusoria at Halle.)<br>of <i>Astasia</i> ( <i>Volvox</i> ) <i>lacustris</i> . |
| 9. Do. Do.....                                 |  |
| 10. Great numbers.....                         | } of <i>Astasia</i> ( <i>Enchelys</i> ) <i>sanguinea</i> .<br>of <i>Astasia hæmatodes</i> .                              |
|  |  |

Bleedings of fish are only to be kept in mind for examination.

Red water-spiders (*Hydrachna*) and *Naideæ*, have never been so deceptive as not to be immediately recognized, and have never excited the attention of mankind.

*b*, VEGETABLE BODIES.

11. By *Trichodesmium erythræum* in the Red Sea.
12. — *Oscillatoria rubescens*.
13. — *Oscillatoria subfusca*.
14. — *Oscillatoria Mougeotii* (Bory,) not the *Osc. Mougeotiana* of Agardh.
15. — *Sphæroplea annulina* (which is of a cinnabar colour.)

*c*, INORGANIC BODIES.

16. — Red atmospheric dust.

II. Are looked upon as a chemical effect produced by the mixing of different kinds of water, the ingredients of which have not been examined. Gonsag.

III. Are looked upon as the operation of volcanic processes on springs.

C. Red moist spots on the ground and on other bodies (blood spots,) are shewn to be an illusion caused by plants.

17. By *Palmella sanguinea* (Thel. *sanguinea*, Persoon.)
18. — *Sarcoderma sanguineum*.
19. — *Mycoderma* (*zoogalactina inebrosa*.)
20. — *Hamatacoccus* Grevillii.
21. — *Lepraria nivalis*, (brick red.)
22. — *Geocharis nilotica*, (cinnabar red.)

To these belong also the matters already mentioned in regard to red-dew and red-rain.

D. Blood-jellies are conjectured to be an illusion caused by plants.

PALMELLA SANGUINEA.

23. By *Actinomyce meteorica rubra*.

Besides these twenty-three terrestrial substances and organic bodies, there are, indeed, many other masses and bodies remarkable for red colours, and which might produce similar appearances; but here we have only to do with such as have been viewed as meteoric or blood masses or whose dense distribution, together with the invisibility of their form, and the striking red colour, which has power to arrest

the attention on surveying a district, and assigns a peculiar character to those substances, which, taken singly, are wholly overlooked, and thus seem of no consequence. Let us keep in mind what are the so called colourless organic meteoric substances; and which are as follows:

#### VEGETABLE BODIES.

1. *Actinomyce metoric alba* (Tremella met.) matter of common falling star.

2. *Nostoc commune*, as the jewel of the alchemists.

3. *Spumaria mucilago*, or *Ethaliium flavum*, which comes within this class. All the observations that are known to me regarding these bodies, especially the first two, excepting the single one from Italy by Menzel, are very unsatisfactory.

#### b. ANIMAL BODIES.

Much has been said about infusoria flying about in the atmosphere; and the existence of meteoric infusoria, assumed as credible, had been made the foundation of other hypotheses, but supported by no direct observations. I know only three observers who maintain this opinion. Gleichen found infusoria in snow which he melted in his room; and Muller quotes the representation of *Kolpoda pyrum* (Gleichen S. 150, k. 27, f. 18-20.)

Whether the snow was taken as it fell, or somewhere from the ground, is not mentioned, nor whether the vessel and the object glass were intentionally cleaned. As it is probable that Gleichen was interested only in observing the influence of cold on these animalculæ, and in this respect alone found the observation worthy of attention, the proof of its being a meteoric production falls to the ground.

Bory de St. Vincent mentions in Dict. Classique, art. Enchelys, p. 158, that he often observed infusoria in snow and drops of rain. As he does not name them, however, we may feel convinced that he did not observe them with particular acuteness.

Professor Schultze, in his work, entitled Microscopic Examinations of Robert Brown's discovery of Living Animals in all Bodies, &c. 1828, expresses himself very decidedly, indeed the most decidedly of all. He does not, indeed, speak of meteoric propagation, but supposes, he observed, that the dust hovering every where in the atmosphere was mixed with dried infusoria, among which he perceived the *Furcularia rediviva* (*Rotifer vulgaris*) and *Monades*. These examinations are certainly founded on error. That dried infusoria scattered and floating about as atmospheric dust, or dust from books, can resuscitate, we can no longer believe, being now better acquainted

with the structure and peculiar properties of infusoria; and it would be very difficult to recognize a shrivelled rotifera, and particularly to discern its species, I refrain from a full refutation. I make the remark only, that I may, on the contrary, receive instructions from more accurate observations.

To avoid illusion, I have, myself, with uncommon perseverance, and the greatest care, examined upwards of a thousand single flakes of snow and drops of rain and dew, the last two even in the north of Africa; but in no one of them have I, at any time, observed living infusoria. From more accurate observations on the organization of infusoria, I have ascertained that the Rotatoria possess all the organic systems of the higher animals, large eggs, and also nerves; that they are supplied with organs of nourishment, and repeatedly evacuate a granular mass, which cannot be taken for any thing else than eggs. The eggs of the rotatoria are so large, that they cannot escape observation if they are looked for; but it is otherwise with the eggs of the gastric animals (Polygastrica,) as I call the rest. These eggs have  $\frac{1}{2000}$ , and probably  $\frac{1}{8000}$  of a line in diameter. Their minuteness and transparency place them beyond the power of the microscope. It is probable that these eggs, raised by currents of air and evaporation of water, may fill the atmosphere, and sustain little injury from aridity, because they appear to settle and develop themselves every where, and are perhaps perceptible in the organized matter, the pyrrhine of the atmosphere observed by chemists. But as to living infusoria and meteoric animals, or what are called Atmospheric Zoophytes, found in currents of air, we cannot believe in their existence until better evidence than the present is brought forward. The forms not hitherto satisfactorily observed are,

1. Kolpodapyrum, Muller, according to Gleichen.
2. Indeterminate infusoria, according to Bory.
3. Flucularia rediviva,
4. Monas termo,
5. Monas lens,

} According to Professor Schultze.

Poggendorff's Annalen, No. 4, für 1830.

## REVIEW.

ARTICLE X.—THE HANDBOOK OF ALLOTMENT AGRICULTURE, IN  
PRINCIPLE AND PRACTICE;

FOR THE USE OF SCHOOLS AND OF ALLOTMENT TENANTS.

*By James Rennie, A. M. &c. 18mo—1s. 3d.*

THIS work consists of 92 pages, illustrated with wood cuts. No doubt it will be found useful in assisting the persons for whom it is intended. It commences with the "Science of Agriculture" much in the same manner as the Handbook of Gardening (reviewed Vol. 3, p. 249) treating on the Months of plants, the sorts of food taken by field plants, Air, Causes of the Growth of Plants, Heat, Cold, and Exposure, Seed Sowing, Steeping of Seeds.—Next follows the "Art and Practice of Agriculture, as rearing Field Crops, keeping domestic animals—as Cow keeping, Pig keeping, Goat keeping, Poultry keeping, and Bee keeping. According to our judgment, the rules given are, generally speaking, very good; at any rate purchasers will find it well worth the price. Allotment tenants, and all persons interested in the furtherance of the Allotment system will profit by its perusal.

HANDBOOK OF GARDENING, New Edition, with improvements, by the same Author, p. 148, 18mo. 1s. 9d.—The former edition of this work contained but 130 pages, in *this* eighteen more are given, several things are corrected, and fresh notes incorporated. Amongst other useful additions, the author has stated the quantities of the several required seeds in order to sow small beds, and hence benevolent landed proprietors may readily make out a list of seeds suitable to give, by way of present, to a deserving tenant. This is certainly an improved edition, and as we recommended the first edition to cottagers and young gardener's, we do not hesitate to say to those of this class, who did not purchase the first—buy this new edition.

HANDBOOK OF PLAIN BOTANY, or Linnæan Lessons on Common Plants for field and garden practice, by the same author, price 2s.

All the Alphabets and handbooks on different branches of science, by Professor Rennie, which have fallen into our hands, are excellent. This handbook of plain Botany will no doubt be very extensively circulated, for with a little application, a person may in a short time obtain from it a good rudamental knowledge of the Science of Botany.

The work is illustrated by numerous wood cuts, and is cheap at the price.

# MISCELLANEOUS INTELLIGENCE.

## ARTICLE XI.—QUERIES AND ANSWERS.

**LIST OF THE BEST KINDS OF GRASSES FOR SOWING, TO FORM A GRASS-PLOT, WANTED?**—Pray can you, or any of your Correspondents, tell me what are the best kinds of grass, to form a lawn? I should like to sow the seeds instead of the usual way of turfing: Will it answer? Turf is not convenient to get here.

W. SHELDRAKE.

**MINING INSECT ON THE CINERARIA LANATA?**—Can any of your Entomological friends inform me, what is the name of the small insect that mines in the leaf of the *Cineraria lanata*, and how it can be readily destroyed? Is it an *Ichneumon* fly?

J. HOWARD.

**TO THE AUTHOR OF THE DOMESTIC GARDENER'S MANUAL.**—In your *Register* for last September, Vol. 3, page 409, you were so good as to insert a few queries addressed to the author of the *Domestic Gardener's Manual*, on the subject of the Housaine Melon; I hope that Gentleman will favour me with an answer, before the time for sowing the seed arrives.

M. D.

**LIST OF ORNAMENTAL CREEPERS WANTED?** Pray would you favour one of your readers with a list of hardy ornamental creepers, or plants suited to be trained against walls, trellis, or arbours in various situations, with some remarks, as to the situations suited for each? Such a list would be of importance to many.

JAMES TOWNLEY.

**OXALIS CRENATA?** If G. E. J. (see Vol. 3 p. 486) will dig up the plants about Christmas, he will find plenty of tubers. Even when he sees this notice, should any of the plants have been left, he would doubtless find a supply of tubers. It appears to be the habit of the plant to form the tubers late. Some plants, from small tubers, planted in the open ground in April, produced upwards of 20 tubers each, at the end of December.

C. M. W.

**ON THE GERMINATION OF SEEDS.**—*In reply to the remarks of "W," Vol. 3, p. 423.*—On perusing the observations of your Correspondent, "W," I find him labouring under as fallacious an opinion as he supposes the editor of the *Encyclopædia of Gardening* to be, when he states that "all self-sown seeds remain on the surface of the soil exposed, &c." but I maintain the opinion they do not germinate in that situation, some of them fall into a crevice in the earth, a

worm hole, or the burrow of some animal, or are trodden in by the feet of others. Then the first shower covers them with soil, and they then germinate, as by observation in the forests of this country I have always found the growing seed so covered, or by the decayed vegetable matter of the autumn, thus proving that nature has an equivalent for harrowing and raking, while the seeds remaining on the surface inevitably perish. The seed of the dandelion will not strike its roots into the box edging, until its *beautiful wings* have perished, and it has dropt into the *dark moist ground*, between the interstices of the box, and then the gardener may wish it had never parted with its parachute.

To conclude, I will propose a chemical question, and *seriously* ask, do seeds, exposed constantly to the light, germinate, or do they only in the darkness of night receive the impulse, upon the acknowledged theory, that vegetables extract oxygen from the atmosphere, and expel carbon in the night, and vice versa in the day? Perhaps some of your intelligent correspondents will favour us with their opinion on this subject. In the mean time, spite of "Jack the giant killer," I shall not reprobate the "noble science of chemistry," for explaining phenomena seemingly different to common observation.

W. M.

INSECTS ON PEAR TREES, ENQUIRY ABOUT? Pray can you tell me the names of the two caterpillars so prevalent in October, and which so curl up the leaves of the pear tree: also a scale which renders the leaves very unsightly by covering with a slimy liquid? I suspect the caterpillars are larvæ of moths. How can they be destroyed?

ANSWER.—The insects enquired about, we suspect, are the same as were figured in Vol. 2, p. 487; in addition to what our Correspondent has named, there is a Slugworm (fig. 13, 1.)

The two caterpillars 2 and 3, both form webs, and very dexterously make their escape to the ground on the leaf being touched. (2) Has a black head and tail, its body is brown, and the annulations are something darker than the other parts of the body. (3) Is considerably larger, with a black head, the ground-work of the body being cream-coloured: it has three longitudinal stripes, of a greenish brown, extending from head to tail, with the annulations or rings of the same colour. We regret, that we are not entomologists enough to tell the name, but should feel very much obliged, if any of our readers would do that favour for our correspondent. To destroy them, see Vol. 2, p. 487.



S. TURNBULL.



## ARTICLE XII.

## COLLECTIONS AND RECOLLECTIONS.

**TO DESTROY INSECTS ON FRUIT TREES.** To destroy insects that infest fruit trees and plants, put into a basin a few handfuls of earth, on which pour a small quantity of spirits of turpentine; then add water, and stir the whole together, until it has a proper consistence to be rubbed upon the trees with a brush. The insects perish, with their genus, the odour remaining several days about the trees, and repelling fresh invaders. A mixture of earth is necessary, because the spirits of turpentine swim upon pure water, and will not mix; and if used in too great quantities, might injure the trees: I cannot doubt, from the trials that have been made, that much benefit might result from the use of turpentine in clearing fields and trees from insects of different kinds, and that a mixture of ashes, and turpentine, would remove, by its odour, the insects that infest turnips. Its odour is more penetrating in the open air than that of sulphur, and some other materials used for the same purposes. It would perhaps be useful in destroying ants, or driving them away from espaliers, and other places.

M. SAUL.

**ON PRESERVING BEES IN WINTER.**—I some time ago, see Vol. 3, p. 31, sent you the account of a mode of keeping bees, through the winter, by burying them in the ground. I now send you another method of keeping them in winter, as practised by Farmers in America. The hives are placed in dry cellars, from which all light is excluded. Upon bringing them again into the open air, in the spring, the bees exhibit an unusual degree of healthiness and activity. This experiment has been found to answer well, and is well worthy of the attention of those persons who are engaged in this branch of rural economy.

**ELEMENTS WHICH CONSTITUTE ANIMALS, THE AIR, AND THE WATER.**—Animals are formed of oxygen, hydrogen, nitrogen, carbon, and earth. Atmospheric air is formed of oxygen and nitrogen, in certain proportions, rendered aerial by the expansive power of heat or carolic; it also generally holds in combination a small portion of carbonic acid gas, or fixed air. Water is formed of hydrogen and oxygen, in certain proportions: and in its common state it always holds a certain portion of earth, and sometimes of carbon, in solution.

Oxygen, hydrogen, and nitrogen are aerial substances, which when in a state of separate existence, are termed gases, and, like the air we breathe, are invisible, and can only be known by their effects; the names or designations which are given to them are derived from the Greek or Latin languages, and express, or allude to, their nature and properties.

Thus it is found, that by the affinity which certain substances have for oxygen, this element, under certain circumstances, is united to them in such a quantity as to convert them into acids: hence oxygen is considered to be the acidifying principle, or generator of acids, which the term implies. Oxygen is also the vital air of life, as without it neither animals nor plants can live; it is also a general principle of combustion, as without it fire cannot exist.

Hydrogen, the basis of inflammable air, is a component part of water, as the term implies; and it is the lightest of all ponderable things. It is hydrogen gas which, when burnt in contact with oxygen produces flame, and gives the brilliant gas-light. It is also this gas with which air-balloons are filled; and which, from being so much lighter than the atmospheric air, enables them to ascend through it.

Nitrogen is one of the elements of nitre: it is also called azote, which implies destructive of life. It is the opposite in nature to oxygen, that is, it is incapable of supporting combustion or animal life.

Carbon, which is derived from the latin of coal, is clearly proved to be an elementary substance; although, like the aerial elements just described, it can only be generally known by its effects; for from the great affinity it has for oxygen, and also for hydrogen, metallic substances, and the earths, it cannot be obtained in a pure and free state but with great difficulty. The diamond, indeed, is considered to be pure carbon, in a state of crystallization, and is the only substance in which carbon is known naturally to exist in a separate state. The purest state in which carbon can be obtained and exhibited, by the common processes of nature and art, is that in which it is combined

with oxygen; and those two elements combined in different proportions, form three distinct compounds, viz. carbonic acid gas, or fixed air, which is composed of 18 parts of carbon, and 82 parts of oxygen in every 100 parts: carbonic oxyde, which is composed of 40 parts carbon, and 60 parts oxygen; and carbonous oxyde, which is common charcoal, and is composed of 64 parts carbon, and 36 parts of oxygen.

Carbon also unites with hydrogen, and thus forms carburetted hydrogen gas, which is carbon dissolved in, or combined with, hydrogen—in this state it always produces a fetid smell—and hydrocarbonate, which is carbon combined with hydrogen in a less quantity than is required to convert it into gas. The mode of obtaining pure carbon, as described by Sir Humphrey Davy, is by burning pure spirits of wine in a glass tube, by which the gaseous part will be dissipated, and the carbon left; and as spirits of wine is one of the most limpid and volatile liquids, this shows how completely carbon is dissolved or divided, and held in perfect combination, in the purest liquids.—*Hayward on Horticulture.*

**LARGE PEAR.**—A Correspondent in Boston, America, says he had the pleasure of partaking, in company with seven other gentlemen, of a Duchesse d'Angouleme pear, measuring a foot round. It was melting, juicy, and sweet, with a fine aroma. It was grown by Mr. S. G. Perkins, of Brookline, near Boston. **MR. SAUL.**

**EXPERIMENTS ON MANURES, BY W. BLACKER, ESQ.**—The following trial of manures for turnips was made this season (1834,) by Col. Blacker, of Carrick, in the county of Armagh.

The ground fixed upon for the crop was meadow land, broken up, and set with potatoes, well manured in 1833, and trenched up during the winter. The turnips, White Norfolk, were sown on the 7th of June last, in drills, manured as under:—

- 1, Pounded Bones.
- 2, Burned Bones.
- 3, Unmixed Peat Ashes.
- 4, Pure Cow-droppings.
- 5, Fresh Lime, laid in Kiln lumps, along the ridge of the drill, and allowed to dissolve with the weather.

No. 4, took the lead in vegetation, by many days, followed by No. 2. The remaining numbers came up pretty much together, about a week later. During the summer and autumn, No. 4, continued to excel in luxuriance.

On the 5th of December, seven yards of each drill being measured off, the produce was taken up and weighed. The following was the result:—

No. 5,—54 pounds; turnips though small, clean, firm, and juicy.

No. 3,—76 pounds; very clean and good.

No. 1,—87 pounds; slight appearance of worm, but on the whole, good.

No. 2.—88 pounds; size large, but showing much top rot, sponginess, and general unsoundness.

No. 2.—108 pounds: a very sound and superior crop in every particular.

The bones were reduced to ashes by their own agency, no fuel being mixed with them, beyond a few dry sticks, which served to kindle the fire in the first instance; it was then supplied with the bones in small quantities: by this means a considerable weight of them was calcined in a couple of hours.

It may be right to mention, that the turnips of No. 2, which terminated its race with so little credit, considering its lead at starting, on being tried about six weeks earlier, were found of excellent quality. But the superiority of the burned bones was on the whole very evident.—*Irish Farmer's and Gard. Mag.*

# THE HORTICULTURAL REGISTER,

APRIL 1ST, 1835.

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## HORTICULTURE.

### ARTICLE I.—REMARKS ON VINES, &c. IN GIBRALTAR.

BY HIJO DE ESPAÑA.

IN referring to the list of the best Vines in cultivation in this country, particularized at page 828, Vol. I, of the *Horticultural Register*, there is one called the "Gibraltar-Produce, dark red, thin skinned—a very good grape." I have no recollection of having met with this kind at Gibraltar, but I have seen Vines there bearing very fine large grapes, which were black, thick skinned, and decidedly superior to the Hamburgh in every respect: these grapes being different to any I ever met with at Algeziras, St. Roque, or any other place in the immediate neighbourhood of Gibraltar, has led me to imagine that this particular kind must have been originally imported from Barbary, during the occupation of that Fortress by the moors.

The Algaroba or Locust-Tree attains the size of any tree of the forest, and strongly resembles the Acacia-Tree of this country. It produces pods like immense kidney-beans, which, when ripe, are of a chocolate colour—these I have partook of in the South of Spain, where the tree is met with, and found them by no means unpleasant to the taste.

This tree is also found in South America, Barbary, and the Holyland, and it must have been the fruit of the Algaroba, with the wild honey, which St. John subsisted on in the wilderness, the more especially as this particular fruit is still used as food by the poor of Palestine. In Spain and Barbary, it is generally made use of in feeding cattle.

I think the Algaroba might be cultivated with safety in the south of England.

## ARTICLE II.

## ON THE FRUIT-TREES IN KASHMEER, AND THE NEIGHBOURING COUNTIES.

BY WM. MOORCROFT, ESQ.

*Being part of a Paper read before the "Agricultural and Horticultural Society of India," October 13th, 1823.*

THE fleshy and pulpy fruits of Kashmeer, consist of Apples, Pears, Quinces, Peaches, Apricots, Plums, Cherries, and Mulberries.

The shell and stone fruits of Kashmeer, are Pomegranates, Walnuts, and Almonds. Altogether the collection of fruits is highly respectable, and announces an attention to Horticulture of no insignificant order.

The apples may be divided into cultivated and uncultivated varieties: the former are named as under:—

Kuddooseree, Super-Kundee, Ambree, Kermanee, Khatoon, and Moe-ambree.

The wildings, or those not grafted, are, Suffed, or White Trela, Soorkh or red Trela, Jambazee.

Among the former some have the acid, and others the sweet principle largely developed, whilst others again possess an agreeable union of both qualities; but in general flavour, all the apples are inferior to those of France or England.

The former of this fruit varies considerably in character betwixt oblate-round and conical, and there is also a considerable variety in their colouring, which is of green, yellow, and red, in distinct and different proportions of commixture. The size, form, and colour of the Ambree, entitle it to be held as one of the most beautiful of the Apple family; and though thin-skinned and ripe in October, it will keep well till April.

The Apples of Kashmeer are generally inferior to the most flavoured kinds of Apples in Europe for the dessert, yet for baking some seem almost equal to the codlin; and many are of special promise for the press.

Were it necessary to indicate particular varieties, for the latter purpose it may be said, that if the red Trela retain its qualities when acclimated in India, its juice will yield a beverage perhaps rivalling that of the red streak; and that of the white Trela, one emulating that of the Golden Pippin.

On the mode of extention it may be sufficient to observe, that budding and grafting are both practised; and that of the latter, the process called stock or crown-grafting is simple and successful.

Pursuing a similar division of Pears, (Putung), the cultivated varieties are the following :—Nakh, Gosh-buggee, Koturnul, Goolabee, Kaghzee, Nashpatee.

The wildings are, Seikatung, Tanjeh, Vetanjeh, Khurtanjeh.

I found only one variety ripe, and which approximated in qualities to the white Beurree, though inferior in quality.

In Ladakh, the Jargonelle and Cressanne were met with ; and as the wild pear is not indigenous to this country, it is presumed that these varieties were introduced from Kashmeer.

The Quince or Broomzoontoo is of three varieties, viz. : Toorsh, Shereen, and Bedana.

The whole of the apple family of Kashmeer seem to be free bearers, and this remark applies especially to the Quince, of which the peculiar flavour is so much higher than any I have seen in Europe ; that it is likely to afford a material, under due management, standing a fair chance of excelling the marmalade of Macon, and is now converted into an excellent preserve.

Peaches, called Soppunoonoo, are of two varieties, distinguished more by one having a bitter and the other a sweet kernel, than by the respective qualities of their pulp, and held therefore as indifferent.

Tser and Bhota Tser, or Apricot of Tibet, neither particularly good.

The best of the family is the white Apricot of Baltee which is in perfection, in the garden of the Kaloon or Prime Minister at Ayoo, but on account of the great distance is only procurable with much difficulty and expense.

A very large Apricot Kotach is found, but it comes in season in the rains, and is generally spoiled, owing to flies depositing their eggs in the pulp.

*Plums* are of few varieties, and as they are not yet fully ripe, I can say little correctly respecting them, except that a green variety called Subza borders on the Green Gage ; but its sweetness is not sufficiently relieved by acid.

The best plum in India is a variety with small fruit in the garden of the Jooma Musjid, in the Fort of Lahore. This has peculiar characters, and seems to hold a rank between a loose-pulped cherry and a plum.

The *cherries*, called here Gilas, are of three varieties : two approach to the character of the Biggarroux and May Duke, and the third is the Morel or late black bitter Cherry. The fruit is rather smaller than that of Europe, and of this, as well as of the Apricot there are wild varieties.

*Vines* are of many varieties, both of exotic and indigenous origin ; of the former are the Moskha, Sahibee, Hoosenec, and Kishmishee, which last was introduced by the Emperor Juhangeer Kabool. The latter, or those indigenous and cultivated, are Pamuthil, Takree, Upamahee, Bura kawur, Nika kawur, Kacheeboor, Kanahepee, Harduch, and Kathoo Hoosenec. The wild Grapes are Deza, Kuwaduch, and Umburbaree.

The four first are good, but it is said that those of similar name in Kabool, are still better.

The skirts of the southern face of the northern hills were formerly largely clothed with vines, and under Hindoo rule, much wine was made.

The practice was continued to, or revived in, the reign of Juhan-geer.

A little brandy is occasionally distilled, even now, and under suitable management might vie with Cogniac.

The *Mulberry* has many varieties, with fruit large or small, sweet or sour, round, oblong, and cylindrical, black or white, with and without seed.

The sweet are Boota, Sea, Suffed, and Bootnee.

The sour is the Shah Toot. No *Mulberry* of Europe, or of Lower India, is equal to the sweet varieties, of which the juice furnishes a material for wine and spirit. The fruit of the Shah Toot is much superior to the Europe *Mulberry*, being larger and more juicy, with a pure rich acid uncontaminated by any medicinal flavour.

This fruit would afford a great resource to the population of India, as well when eaten ripe, as for wine and vinegar.

The *Pomegranate* has the following varieties, viz. ; Duhan, Julabadee, Kathidehun, Hudehun, and Jiggree.

Several of these are particularly fine as to flavour, and the size is large.

The *Almonds* are not especially good. The Walnuts are of four varieties, viz. : Kanuk donoo, which is wild and worthless ; Wantoo, Doonoo, and Kaguzee. The three last are cultivated, and the Kaguzee is the best, but its thin shell exposes its kernel to the attack of the Boobool.

In Kashmeer, the Custom-house pass return of the produce of the fruit in Oil ; and Oil Cake amounts annually to 1,30,000 Rs. independently of the quantity of nuts consumed by man. The quality of the wood of the cultivated walnut also, for gunstocks, is little inferior to that of Britain.



## ARTICLE III.

## UPON THE APPLICATION OF HOT-WATER IN HEATING HOT-HOUSES.

BY MR. THOMAS TREDGOLD.

Extracted from his Paper.—Read before the London Horticultural Society, August 5th, 1828, and inserted in their "Transactions," Vol. 7, page 568.

THE power of imitating other climes and other seasons than those which nature affords us, is known and valued as it ought to be; yet it remains difficult even to imagine the extent to which this power may be applied; in this age it produces luxuries of which few can enjoy more than the commonest species; but in the next—nay, even in our own, there is a reasonable expectation of a considerable addition to the quantity and quality of those artificial productions, as well as to the best sources of pleasure and information they afford to the admirers and students of nature.

The vehicle employed to convey and distribute heat in the new process\* is water, for it has been found that in an arrangement of vessels connected by pipes, the whole of the water these vessels and pipes contain, may be heated by applying heat to one of the vessels; and that in this manner—a great extent of heating surface, and a large body of hot-water to supply it, may be distributed so as to maintain an elevated and regular temperature in a house for plants, or indeed in any other place requiring heat.

The obvious advantages of this method are, 1st. the mild and equal temperature it produces; for the hot surface cannot be hotter than boiling-water: 2nd. the power of heating such a body of water as will preserve the temperature of the house many hours without attention; and, 3rd. the freedom from smoke or other effluvia of smoke flues. In houses appropriated to plants, these advantages are most important.

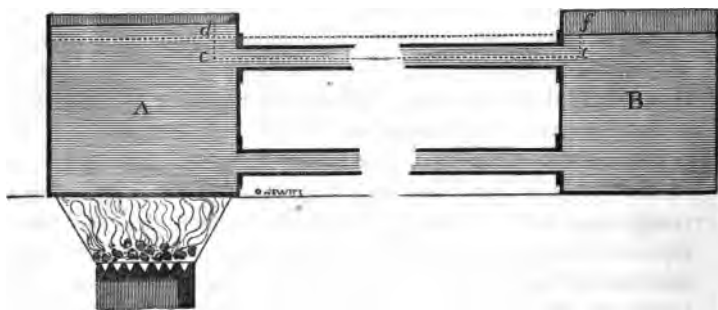
In order to develop the principles on which a hot-water apparatus acts, we may select the simple case of two vessels placed on an horizontal plane, with two pipes to connect them; the vessels being open at the top, and the one pipe connecting the lower parts of the vessels, and the other their upper parts.

If the vessels and pipes be filled with water, (fig. 14) and heat be applied to vessel A, the effect of heat will expand the water in the vessel A; and its surface will, in consequence, rise to a higher level *a, a*; the former general level surface being *b, b*.

\* Alluding to the first discovery of the System, by Mr. W. Atkinson, and published in the Hort. Trans. Vol. 7, page 203.

The density of the fluid in the vessel A, will also decrease in consequence of its expansion, but as soon as the column *c, d*, of fluid above the centre of the upper pipe is of a greater weight than the column *f, e*, above that centre, motion will commence along the upper pipe from A to B, and the change this motion produces in the equilibrium of the fluid will cause a corresponding motion in the lower pipe from B to A, and, in short pipes the motion will obviously continue till the temperature be nearly the same in both vessels, or if the water be made to boil in A, it may also be boiling hot in B, because ebullition in A will assist the motion.

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The causes which tend to retard the motion of water in the pipes are, 1st. the contraction of the moving fluid at the orifice of the pipes; 2nd. the friction of the fluid in the pipes, which sets the limit to the distance to which the pipes can be extended to produce the proper quantity of useful effect; but, it is remarkable, that the higher the temperature of the moving fluid, the less its friction; 3rd. the motion is retarded by the cooling of the fluid, in its progress along the pipes, such cooling having a tendency to produce a double current; and 4th. by bends and changes of form.

It will be evident to any person of philosophical research, however, that in considering water the only liquid capable of being employed, we should be losing sight of one of the greatest advantages resulting from the knowledge of natural phenomena, for all liquids expand by heat; and hence, in all of them its partial application would produce motion under proper circumstances; while the boiling points of different liquids are at such different temperatures that we may vary the ultimate temperature of the heating surface from 100 to 600 degrees, that of water being 212 degrees. This mode of considering the subject, opens a new source of speculation and improvement.

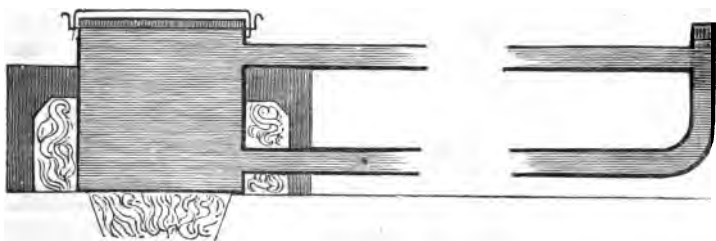
From the common principles of hydrostatics and the equations obtained, the following practical deductions may be derived.

1st. The more expansible the liquid is, by a given change of temperature, the greater will be the velocity.

2nd. All other things being the same, the velocity will be increased in proportion to the square root of the depth of the boiler: therefore, in a boiler four times as deep, the velocity will be doubled.

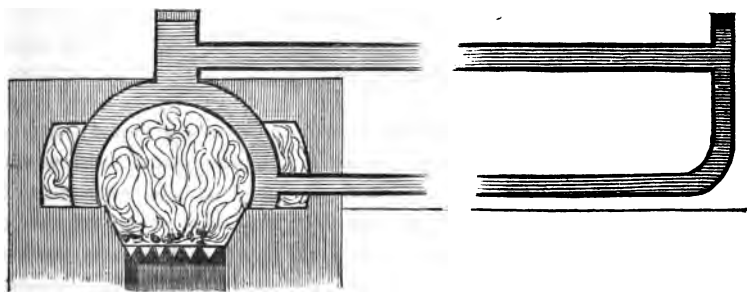
3rd. If there be sufficient service of pipe for the object required, a reservoir is not necessary to the motion of the water; a simple bent pipe (fig. 15) being all that is essential to motion: the reservoir is only to reserve a hot mass of water to maintain the heat after the fire has gone out.

15



4th. If a boiler have sufficient surface to receive the effect of the fire, and the whole apparatus contains as much water as will convey the heat from the fire to the heating surface in the time corresponding to its velocity, its capacity need not be further increased, except as a reservoir of heat, to act when the fire ceases to burn. (fig. 16.)

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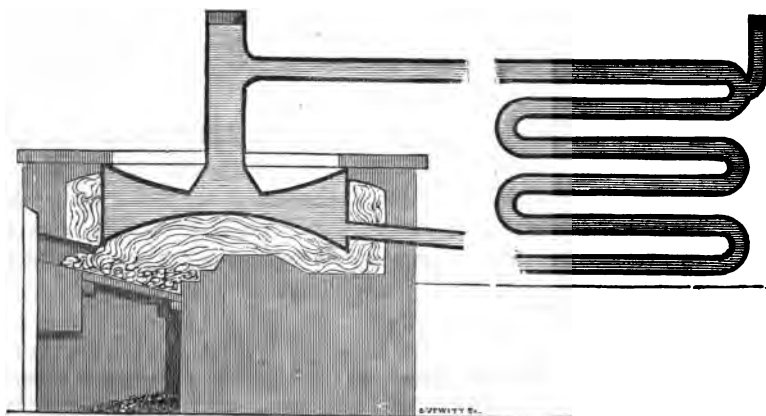
5thly. Where heat is required only during the action of the fire, a large surface in proportion to its capacity may be used with advantage to give off heat over the descending pipe; (figs. 17 and 18) cooling in this manner will increase the velocity.

6thly. The Aperture of the upper pipe should not be more than about an inch below the surface of the water; or as much as prevents its drawing air, in an open boiler; but the lower it is below that, the less effect will be obtained: the lower pipe should enter the boiler where it has least tendency to cool, and check the fluid rising to the upper pipe from the fire surface.

17



18



7thly. In a close boiler, a pipe may, at any distance from the boiler, rise to any height and descend again; but it must neither rise twice, nor dip after leaving the boiler; where it is necessary to raise it, there should be an open pipe inserted at each extremity of the height of the rise: advantage has been taken of this circumstance to avoid doorways. (Fig. 19.)

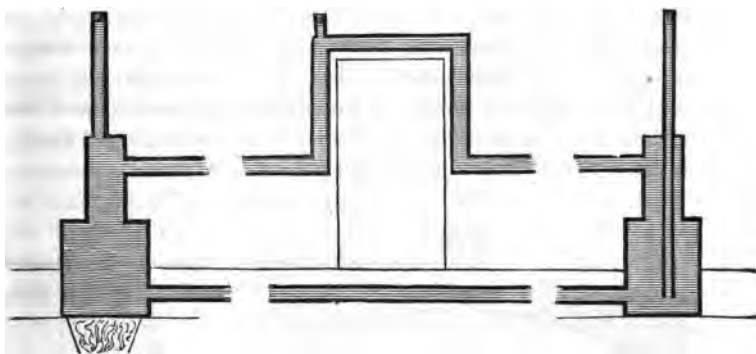
8thly. A certain quantity of motion would be obtained by a single horizontal pipe between any joints except the bottoms of vessels; but, the nearer to the surface, the more motion will be obtained; and, with one pipe, there must be a double current in it.

9thly. The retarding effect of friction is directly as the length, and inversely as the diameter of the pipes; it is also increased by every bend angle in the pipes.

It is a fact, not so generally known as it ought to be, that if we communicate a certain quantity of heat to a liquid, it will give out exactly the same quantity again in cooling to its former temperature; less or more it cannot afford. It is equally true that, with the same temperatures, equal and like surfaces give off equal quantities of heat to air, &c.; and consequently, the quantities of heat exchanged under given circumstances are measurable quantities, and this subtle element is brought within the domain of science\*.

In general for Hot-houses, twice the number of feet contained in the area of the surface of glass, will be equal to the number of cubic feet of air, which that surface should heat per minute when in full action.

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Now the heat given off by the surfaces of the apparatus depends on the kind of materials they consist of. When bright tinned iron, earthenware, &c. are employed for pipes, much more surface is necessary.

If the cubic feet of air to be heated per minute be multiplied by the number of degrees it is to be warmed, and the result be divided by twice the difference between the temperature of the house, and that of the surface of the pipes, the result will be the feet of surface of iron pipe, &c. required.

It is known from experience, that the heat which raises the temperature of one cubic foot of water one degree, will heat 2850 cubic feet of air one degree.

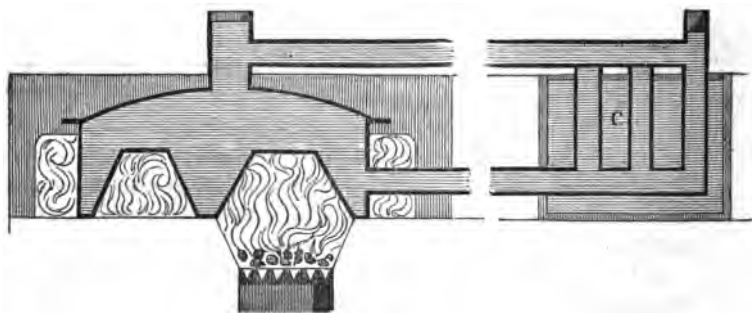
\* Sir Isaac Newton first established the laws of heating and cooling, in the Phil. Trans. for 1701.

The most important of the properties of the hot-water method, consists in the power it has of keeping up the temperature of the house for a long period without attention from the attendant: and it is entirely owing to the excess of fluid that it has this advantage over steam heat.

The ordinary method of making reservoirs and boilers so large as to answer the purpose of maintaining the heat during the night, has the objection of rendering it a considerable time before the apparatus can be raised to a temperature capable of giving much heat; and it appears that it would be a material improvement to heat the water for a reserve of heat, by passing the pipes of the apparatus through the water so that its temperature should be slowly raised, and the house receive heat during the time.

A small proportion of surface of pipe will heat the water, because, water abstracts heat from a heating surface with about twenty times the rapidity that air does at the same temperatures; hence, by putting a twentieth part, in addition to the surface required for the house, through a proper reservoir of water, it will be slowly raised to nearly the same temperature as the water in the pipes, and return its heat to the house as soon as the fire ceases to keep up an excess of heat in the pipes. Fig. 20, shows such an arrangement where *c* is the cistern, with part of the pipe passing through it.

20



There is very little strain on the borders of hot-water apparatus, except in cases where there is much difference of level; and, as these rarely occur, consequently they may be constructed in the best mode for applying heat, which is most effectively done by having as much bottom surface as possible, with a boiler of a given capacity. For burning a bushel of coals per hour, the area of the fire grate should not be less than eight, nor greater than sixteen square feet, and the bottom surface four times the area of the grate, with

thirty-two feet of side flue; and a considerable advantage results from adopting the larger proportion for the grate and bottom surface, on account of the fire requiring less attention.

The forms of boilers may be varied in a considerable degree, provided the above quantity of surface receives the effect of the fire; the first kind used by Mr. Atkinson, was a parallele-piped with the fire applied to the base only. I have employed the same form, but of greater length in respect to its width, hence of less capacity, and made the flue to go round the sides of the boiler; it is then of great length and very effective, and this I consider the best and most simple plan for an open-topped boiler, serving as a partial reservoir of heat.

A boiler in the form of half a hollow cylinder, affording a great quantity of fire and flue surface, is made by Messrs. Bailey, (fig. 16); and a bottle-shaped boiler (17) is made by Messrs. Cottam and Hallam, which has a considerable quantity of fire and flue surface, compared with its capacity; both these are, therefore, well adapted to cases where only a small reserve of heat is required for night. The variation of the Scotch distiller's boiler (18) is also a good form for maintaining the supply of heat to the house, while a separate reservoir is warmed by one of the pipes.

Another mode of obtaining a large portion of fire and flue surface to a small capacity, is shown in figure 20, but complicated forms have little to recommend them, and are expensive except when so small as to be cast in iron, because the fire should be partially surrounded by slow conductors of heat to prevent the dissipation of heat being too rapid, and to render the combustion of the fuel perfect, and, consequently effective; hence, a fire-place surrounded on three sides by bricks, is better than one in the middle of the boiler.

The best mode of regulating the fire, is by means of a door to the ash-pit, having a register, first suggested by Dr. Black, and afterwards put in practice by Count Rumford.

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#### ARTICLE IV.—ON THE GERMINATION OF SEEDS.

BY THE AUTHOR OF THE DOMESTIC GARDENERS' MANUAL.

In page 115 of the last Number, (March, 1835,) I observe a notice by "W. M." upon some remarks upon this subject by "W." which appear to call for a reply by one who is prepared to enter upon the investigation of it, practically. I am not willing that the mere *gratis dictum* of any authority, however high it be, should pass as law, in

matters connected with the phænomena of vegetation; for nothing tends more effectually to keep the mind in trammels, and prevent the progress of true science than that species of mental idolatry which attaches faith, without due experimental investigation, to certain received opinions that have been handed down from father to son, as facts not to be questioned or doubted.

It has long been asserted, and sturdily maintained, that seeds will not germinate in the light; and men have listened to the assertion till they not only believe it, but consider it as founded upon an irrefragable law of nature. But what is the fact? Why simply this, that although we may safely admit that, in most instances, seeds, if covered to a certain extent with earth, are in a situation wherein they are best prepared to germinate, yet there are exceptions to the rule, so numerous, so palpable, so well authenticated,—that, he must be but a very superficial, or a very prejudiced observer, who could hesitate to acknowledge and admit their validity.

Since I perused the notice in question, I determined to bring the matter to issue, by a few simple experiments which could be repeated by any one who possesses a hotbed frame, or forcing department of any description.

Upon the surface of the soil in some pots in a hot-house, which had been previously levelled and duly wetted, seeds of lucern, winter spinach, melons, kidney-beans, peas, and acacias (*Robinia*) were laid. A few days only have elapsed, since these experiments were commenced, and the progress of the seeds has been attentively watched at every period of the day, and to a very late hour at night. The pots stand in a bed of leaves at 85 degrees, but their rims are considerably above the surface level. The lucern swelled almost immediately; their radicles were protruded very shortly afterwards, they each formed a curve, entered the earth, and many green plumules ascended bearing the *testa*, or husk of the seeds upon the summits: one night two small slugs from the leaves were detected, their instinct, we may suppose, having led them to the tender plants, many of which they had obliterated. Here are two facts which bear upon the point of enquiry. The Spinach was soon in action, many seeds sent out a radical process, beautifully covered at the points with a white down (*Spongioles*) resembling a mass of cotton-wool. The young plants are now standing, some more than half an inch high, erect, and in perfect verdure, the long cotyledons widely expanded. Three melon seeds have produced radicles from the more pointed end of the seed, which lies flat on the soil. The *Robinias* (seed from a large tree in a shrubbery) have swollen, one even has



begun to sprout, but in general, time has not been yet afforded to determine the issue. So far I speak concerning the express subject in view: the fact is confirmed by another evidence that has been afforded by what may be called chance. In another pot, seeds of *Hibiscus apicanus* had been sown in two small drills, and covered to a slight depth: two or three fell upon an intermediate space: their radicles have pushed into the soil, and the black head of the husk is still above ground ready to be carried up with the plumule. As to the progress of growth, I am quite sure that, the plants have advanced well *during the full light of day*; and as I cannot admit the "acknowledged theory" that plants extract oxygen, and "expel carbon at night"—because I cannot perceive upon what *natural*

facts it is grounded, I hold by the evidence of my own observations, and believe that, plants grow and thrive during sunshine (under glass,) as much, or more than they do during the night. Our experimental philosophers have been too apt to deduce hypothesis from vegetable phænomena, induced by placing vegetables in *unnatural* situations. Plants in bell-glasses, confined with oxygen and other gases, are not in a state of nature; and he who hopes to determine the cause of a purely natural phænomenon by employing artificial and *unnatural* agents, is equally liable to delusion as another, who hopes to determine the nature of the sap vessels and course of the sap by investigating cuttings and portions amputated from the living plant, and thus cut off from the regular sources of impulse and supply.

I omitted to mention the peas—there were four seed—all of which have sent down a curved root process, and the mass above is much enlarged. The two kidney-beans rotted almost immediately.

March 15th, 1835.

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#### ARTICLE V.—A FEW HINTS ON FORCING PEACHES.

BY W. W. S.

ABOUT the end of November, or the beginning of December, I put the lights on my peach-houses for the first crop, and make fires for a few evenings to dry the flues. In about a fortnight after this, I make gentle fires regularly every evening, but allow them to go out in the mornings, and give the trees a great quantity of air by day, but shut the house close again every evening.

In the beginning of January, give them sufficient warmth to raise the thermometer to 55 degrees by day. The buds will now begin to break ; as soon as this takes place, I cut out all superfluous wood, leaving such as have fine plump buds, and have every appearance of growing vigorously during the succeeding season, and cutting out all such as is weakly and diseased : after having done this, I tie the branches properly and neatly to the trellis, and syringe them all over every morning.

When the blossoms begin to expand, I cease to syringe the trees until after the fruit is set. During the time of blossoming, I think it indispensable to give a deal of air, unless the weather be very cold and stormy, in which cases the blossoms might be injured.

After the fruit is set, syringe the trees three times a week, and throw some water upon the flues every evening after having shut up the house, the young shoots will now have put out some length ; these will require to be thinned out, which is best done by rubbing them off with the finger and thumb ; leaving not more than three wood buds on a branch of a foot long.

By the middle of February I increase the heat to about 60 degrees by day, and 55 by night, and continue to sprinkle the trees with water about three times a week, and give a good supply of air in fine weather. The fruit now requires thinning out, but I find it necessary to allow rather a heavy crop to remain, as in a general way there is a considerable loss at the time of stoning.

The process of stoning commences with me towards the middle of March ; great care is now requisite with regard to fire heat, I find that 55 degrees by day, and 50 by night, is as much as they will safely bear. Air is an indispensable requisite now, a deficiency here, will soon make havoc amongst the crop by causing it to fall off ; but if they have plenty of air, and are not hurried with fire, there is no danger of their falling off, unless the tree be unhealthy.

The stoning season is over about the middle of April, I find the heat may then be increased to 70 degrees by day, and 65 by night ; I syringe every day, and throw water on the flues, which greatly assists the fruit in swelling up, and by the beginning of May my fruit ripens. As soon as the fruit begins to change colour, I give a deal of air, and keep the house dry, which is sure to make the fruit have a good flavour.

## FLORICULTURE.

## ARTICLE VI.—OF THE GENUS GLOXINIA.

BY THE AUTHOR OF THE DOMESTIC GARDENERS' MANUAL.

THIS most elegant family stands pre-eminent in the Natural Order—*Gesnéria*. A few years only have passed by, since this order comprised two genera only—namely—*Gesnera* and *Gloxinia*: now—subsequently to 1820—it has received four additional families, some of which have been separated from *Gesnera*, or *Gesneria*.

The six Genera now ranking in the order, are

1. *Gesnera*—the type; named after the Swiss botanist, Gesner: almost the whole of the numerous species have been introduced since the year 1815.

2. *Gloxinia*. Of this fine genus—one only—*maculata*, or the spotted stalked—was known in the eighteenth century—all the others are new. The name is derived from the French botanist, Gloxin.

3. *Sinningia*, so called from a gardener of the name of Sinning: it is a new genus—the first species of which was introduced in 1820.

4. *Codonophora*—from *Κωδων*—a bell—or trumpet-mouth, removed by Dr. Lindley from *Gesnéra*.

5. *Pentaraphia*—literally means five needles—one species formerly—*Gesneria ventricosa*—a Jamaica plant, 1823.

6. *Besleria*—from *Besler*, a German Apothecary. This Genus is old—it formerly belonged to *Schrophularinæ*.

These Species are almost all natives of hot, tropical climates, and, therefore, rank as stove plants. They have many characters in common, and may perhaps be all successfully grown in decayed wood, or the vegetable earth of leaves and sticks, blended with a little sharp sand. I shall, however, confine myself to the culture of a few of the species of *Gloxinia*, as these are not only most readily procured, but are objects of peculiar and striking interest.

GLOXINIA is found in the fourteenth class—second order of the Linnæan System of Botany; *Didynamia Angiospermia*. The Stamens are four, unequal in size, that is, two are shorter than the other. The Calyx is five-leaved, fleshy, the terminations pointed. *Corolla* bell-shaped, or closely resembles that of the fox-glove, its limb, or border, unequal, oblique. Filaments of the stamens inserted in the receptacle.

*Gloxinia Speciosa*, specious or showy G. has been cultivated since 1815, and is a native of South America. There are two vari-

eties; one with beautifully blue, rather pendulous blossoms, tinged with purple, very glossy, or with the peculiar blush of silk velvet: another with white flowers—the leaves are large, oval, border notched (*crenate*), stalked, sealed close to the root; or is without any stem.

*Gloxinia caulescens*—from Pernambuco in 1825. This species differs from the last in having a stem, which rarely however attains the height of a foot; but the leaves are produced from it, and these are of a darker green, more rigid and firm than those of *speciosa*: the flowers are larger, of a more intense blue, relieved with purple. They are most elegant.

*Gloxinia hirsuta*, hairy G. a lovely little plant, with downy stalks and leaves; the tint of which is olive green. The flowers are more numerous, at least in the specimens which I have cultivated, they are of an extremely pale purplish tint, approaching to white, elegantly striped with a red-purple. This species is also a native of South America, introduced in 1824.

It is said to be multiplied by division of the roots; and in fact, I have, heretofore, failed to raise it by the usual processes, though I hope during the present season to succeed by another mode of proceeding. Two years since a plant was sent me, the radical process, or bulb of which, was scarcely as large as a pea; I placed it in pure sandy peat earth (bog, or heath-mould), and it produced four little leaves. In 1834, with fresh earth and one remove to a pot three inches across at the top, and three and a half deep, it flowered and adorned the window or mantle-piece of a sitting-room throughout August.

The three species or varieties of *Speciosa* and *Caulescens*, are readily increased by cuttings of the stems at any time after they emerge; or by leaves taken off with the little bud attached to the base of the leaf-stalk. These may be placed in silver sand or even heath-mould; and if kept temperately moist, and in a close frame, with a heat of 70 or 75 degs. will produce roots. But the most interesting process, is perfected by taking leaves with the bud, placing them singly in a phial of water on a delf over or upon a flue, or plunged in a leaf-bed where a gentle heat of 75 or 80 may be maintained. After a few days, the part that joined the stem becomes convex, enlarges, assumes a rather hemispherical form, and sends forth a few silky fibres: these elongate; more are produced, and in three weeks (more or less as circumstances occur) the plant may be lifted from the water, and transferred to light peat earth, at first well filled with white sand, in a very small pot. The minute leaves which formed the germ upon the base of the leaf, enlarge, others are

sent forth, and a complete little plant is developed. Finally, a perfect bulb, or more properly, a tuberous underground stem is formed, and this, when the leaves wither, retains the vital principle during the winter.

I shall not enlarge upon the treatment of the tribe during the torpid season: it is known to most gardeners, and has been correctly described. My chief object in writing this paper, has been to present a concise history of *Gloxinia*, and to point out the facility of propagating some of its species by the agency of water.

Feb. 9th, 1835.

#### ARTICLE VII.—CULTURE OF THE HYACINTH.

THE Hyacinth is a native of the Levant, and is said to be abundant about Aleppo and Bagdad. It has been cultivated in Holland with great success for several centuries. Some of the sorts have been sold for incredible sums, as £200 or £300 for a single bulb. There are but three species known in this country, the *H. amethystinus*, *brumalis*, and *orientalis*. The varieties of the last species are very numerous, amounting to many hundreds, all very beautiful, but the names of which are entirely arbitrary. The following select list may probably be some guide in the purchase of a small number, when the individual purchasing is unacquainted with them:—

##### DOUBLE WHITE.

Anna Maria  
Gloria Florum Suprema  
Grand Monarch de France  
Héroïne Grande  
La Mode Epuisée.

##### DOUBLE YELLOW.

Alexander Grande  
Bouquet d'Orange  
Duc de Berry d'Or  
Jaune Pyramide  
Ophir  
Pure d'Or.

##### DOUBLE BLUE.

Bouquet pourpre  
Grand Vidette  
Gustaff de Deide  
Quentin Durward  
L'Abbe de Verroch  
Rudolphus.

##### DOUBLE RED.

Acteur  
Augustus Rex  
Duchesse de Parma  
Henri Quatre  
Marquesse de la Costa  
Rex rubrorum.

##### SINGLE WHITE.

Grand Vainquer  
Prince de Galitzin.

##### SINGLE YELLOW.

Princess Charlotte  
Princess of Orange.

##### SINGLE BLUE.

La Crepuscule  
Nimrod.

##### SINGLE RED.

L'Eclairé  
Temple of Apollo  
Van Wondell.

To grow Hyacinths to perfection, the following rules may not be without their use :—

1. The soil should not be too heavy, but of a fine rich nature. Let the component parts for a bed be as follows :—equal parts of rich loam, taken from the top spit of a pasture field, very rotten cow-dung, at least two years old, leaf-mould, peat, and fine sand. Break the turf well, throw it in a heap, and frequently turn it, until it is well rotted, then mix the whole together, and allow the compost to lie, if possible, six months before it is used. Sea-sand is preferable to any other if it can be procured.

2. The bed on which the bulbs are to be planted, should be made about four feet wide, in a warm and dry situation, for, although hyacinths grow freely in water alone, they soon receive injury or entirely perish if planted in wet situations.

3. When the situation for the bed is determined upon, dig out the soil two feet deep, and loosen that at the bottom of the trench, so that all superfluity of moisture may be able to drain away ; then lay about four inches of rotten cow-dung at the bottom, and fill the trench with the above compost to eight inches above the surface of the surrounding ground in the centre, and two or three inches at the sides of the bed. Some persons make their beds with a regular slope from back to front, facing the south ; and this system is not without its advantages.

4. Always make the bed by the middle of October, which will be about a fortnight before the time of planting. This gives it time to settle properly.

5. *Choice of Bulbs.*—The bulbs most likely to flower best are those of a middle size, solid, and conical ; all flat crowned ones are apt to break into offsets, and at best produce very poor flowers.

6. *Time of Planting.*—The best time of planting is the beginning of November, although some persons do it as early as the third week in September, but when done so early the plants usually appear above ground in the depth of winter ; others again do not plant till the end of November, or even later ; but in this case the roots become greatly weakened by their tendency to vegetate.

7. *Manner of Planting.*—The bed having well settled, prepare to plant by raking the surface smooth and level, then spread over the whole about an inch thickness of dry sandy soil, mark out the rows on the bed either lengthways or across (the former looks the best), eight inches apart ; this can readily be done either by means of a line, or, if across, a rod. Having marked out the rows, mark the exact spot for each bulb in the rows eight inches apart, planting

them so as to form triangles. Lay in each marked spot a small quantity of sand for the bulbs to rest upon.

8. This being done, select the bulbs and place them in the situations appointed for them, carefully avoiding two of the same colour coming in contact with each other; then take a handful of sand and place it upon and around each bulb, so as to cover it. After which cover the whole bed with fresh light loam until the bulbs are covered two inches deep, smooth the surface, and the business is completed.

9. *To Preserve from Rains and Frost.*—Some persons follow the practice of covering the beds with three or four inches of rotten dung, but this is always injurious more or less; dry litter answers the end much better than either rotten dung or turf; but when the weather is windy, this is apt to be blown off, and make the garden look uncleanly. The best way of all is to hoop the bed over, and cover it, when necessary, with mats; for moderate rains and slight frosts covering need not be resorted to, if about three inches thickness of old tan be laid over the bed on the approach of winter; that is, about the beginning of December.

10. When the weather is fine, the bed must always be exposed to effects of the sun and air, or the roots will grow and flower weakly.

11. From the beginning to the middle of April the flowers will begin to show their colours. If the sun is powerful, shading must be resorted to, or some of the finer coloured sorts will be faded; this may be done by means of mats and hoops; but a neater covering is that of an *awning*, which should extend over the walk round the bed also. The framework of this awning merely consists of four or more posts about seven feet six inches high, being placed firm in the ground, either two or more on each side the bed, according to its length; on these posts should be fixed a frame made of light materials, in the form of the roof of a house. On the roof of this frame, and as far down the sides as is necessary, the sheet or canvass may be strained, and if rolled up or let down by means of cords and pulleys it will still be more convenient.

12. When the flower-stems have grown about four inches high, it will be necessary to tie them to neat thin sticks, or they are liable to be broken by the wind.

13. Unless the season be excessively dry, watering is always unnecessary, for the dews and rains which fall upon the beds are usually more than sufficient. And after the flowers fade, and the foliage begins to die, moisture becomes injurious.

14. As soon as the flowers begin to fade, the awning should be removed, or the bulbs will be greatly weakened: still the roots must

be preserved from heavy rains by means of mats and hoops; the mats being thrown over just at the time of the shower, and removed as soon as it is over.

15. When the leaves are somewhat withered, immediately proceed to take up the bulbs; carefully avoid cutting off the leaves, until they are perfectly dead, for if the tops be cut off too soon, canker and rotteness is the consequence.

16. When they are taken up, rake the surface smooth on part of the bed, and spread about an inch thickness of sand over it; then lay the bulbs on the sand at such a distance as not to touch each other, and cover them with dry sand, being careful not to cover the dying leaves; there let them remain exposed to as much sunshine as possible, but secured from all rains or moisture until the roots are perfectly ripe, which will be in about a fortnight or three weeks.

17. When the bulbs are thoroughly ripe, which will be known by the leaves having become entirely shrivelled and dead, cut the tops off from the crown of the bulb quite close, taking care not to cut into the living part of the crown; rub off the dead fibres, and spread the bulbs in a dry airy room for a few days, cleaning off all soil or dead loose skins that may adhere to them, separate the offsets, and wrap up the bulbs in paper bags until the time of planting again.

18. *Forcing*.—The bulbs of hyacinths are weakened by forcing, but they usually produce the finest offsets, which, when judiciously treated, will soon flower very finely. There are two or three ways of growing them in houses, either in pots or glasses, or fine sea-sand.

19. *Growing in Pots*.—In preparing pots for them, select such as are about four or six inches deep, according to the kind intended to be planted, and three inches wide; put a little rotten dung in each pot; fill each pot up with light rich soil, and plant the bulbs so shallow that nearly half the bulb stands above the soil. Plunge the pots in the open air, and cover them six or eight inches deep with rotten bark, or light sandy soil. During spring take them out as they are wanted to be brought into flower, and set them either in a greenhouse or in the window of a warm room.

20. When the flower begins to expand, and during the whole time of flowering, supply them with manure water; but as soon as the flowers fade, and the leaves begin to decay, cease by degrees to water them, until at length it is discontinued altogether, for when the leaves are dying water becomes injurious.

21. *Growing in Glasses*.—The best kind of glasses for the purpose, are those of a dark green colour, the roots of the bulbs are not so liable to be injured as those in the light coloured ones: but with care either kind will do.



22. Place the glasses in a light airy situation, and the water will require to be changed once in three or four days.

23. If drawn up weakly, it will be necessary to support the stems with sticks, split at the bottom, so as to fit on the edge of the glasses at the top. This, however, will not be necessary if they be kept in a light and airy situation.

24. When out of flower, plant them in pots of soil, to perfect their leaves; place them in a situation where they will receive a gentle warmth; water as often as they require it, until the leaves begin to fade; then treat them as recommended before, and they will flower again the succeeding year.

25. *Growing in fine Sea-Sand.*—It has been stated that hyacinths grow better in fine sea-sand than in water-glasses. We are scarcely prepared to speak either for or against the practice, having never tried the system. There is little doubt, however, according to our judgment, but sand would answer, if it were kept constantly moist; but if allowed to become dry, the bulb would evidently not make much progress.

26. *Diseases.*—They are subject to numerous diseases, particularly one termed the ring: the cause of this malady is yet unknown. It has been found that bulbs, kept regularly in the open ground, are not liable to it like those dried and kept up in bags. The only remedy known is, to cut out the infected part as soon as it appears, and expose the wound to the influence of the sun and air, until it is healed. The crown of the bulb is sometimes injured by the bed being exposed to heavy rains: by this the bulbs will grow into offsets, and not flower. Others again have their fibres injured from the same cause, by which means they flower very weakly; as they do also when infested with the wire-worm.

27. *Propagation by Offsets.*—These may be planted on beds a fortnight sooner than the usual time of planting the flowering bulbs. Make the bed of good light rich mould, raised six inches above the level of the surrounding ground, rounded as recommended for the flowering bed.

28. Plant the bulbs in rows, six inches apart, and four inches from bulb to bulb, or closer if they are very small; cover them with about two inches of light dry soil; and nothing more is necessary than to keep the bed free from weeds, and occasionally stirring up the soil on the surface of the bed.

29. Take them up at the same time as the flowering bulbs, re-plant them at the proper season, and treat them afterwards in every respect as the old bulbs.

30. *Propagation by Seeds.*—Select some of the finest single or semi-double ones for producing seed, such as have strong fine stems, and well-formed bells; but always prevent the bulbs intended for flowering the succeeding season from bearing seed, or they will be materially weakened.

31. Never gather the seed until it is perfectly ripe, which will be known by the seed-vessels beginning to open. Cut off the whole stem, and place it on a sheet of paper in a dry, airy room, until the time of sowing. This is always preferable to clearing it from the husk, because, when done so, it is apt to shrivel, and seldom grows freely.

32. The best time to sow is in October, about the same time that the offsets are planted. Fill boxes or pans with good light loam and sand, or with the same kind of soil as recommended for planting the bulbs in. Cover the seed not less than one-fourth of an inch, nor more than half an inch deep.

33. When the seed is sown, place the pans or boxes in a greenhouse, or frame, during winter. In the spring remove them to a somewhat shaded situation; and they require little attention, except keeping clean from weeds, until they are up; they will then probably require occasionally watering. When the tops have died down, add a thin layer of fresh soil to the top, but without disturbing the roots, until the leaves have died the second year, when the bulbs may be taken and replanted, after the manner of old bulbs or offsets.

34. If so treated, some of the strongest will very likely show flower the third or fourth year after sowing; they may then be selected—the good ones for beds and forcing—the moderate ones for border-flowers.

*Criterion of a good Hyacinth.*—"The stem should be strong, tall, and erect, supporting numerous large bells, each suspended by a short and strong peduncle or footstalk, in a horizontal position, so that the whole may have a compact, pyramidal form, with the crown or uppermost flower perfectly erect. The flowers should be large and perfectly double; that is, well filled with broad, bold petals, appearing to the eye rather convex than flat or hollow: they should occupy about one-half the length of the stem. The colours should be clear and bright, whether plain, red, white, or blue, or variously intermixed and diversified in the eye: the latter, it must be confessed, gives additional lustre and elegance to this beautiful flower. Strong bright colours are, in general, preferred to such as are pale."

*Maddock, and Encyclop. Gard.*

## ARTICLE VIII.—CULTURE OF THE GENUS RESEDA.

THERE are twenty species of *Reseda* known to botanists, of which probably half are not worth cultivation; some are ornamental, and others delightfully fragrant. The dyers' weed (*Reseda luteola*) is much cultivated for its colouring properties. "It affords a beautiful yellow dye for cottons, woollen, silk, and linen. Blue cloths are dipped in a decoction of it in order to become green. The yellow colour of the paint called Dutch-pink is obtained from this plant. The entire plant when it is about flowering is pulled up for the use of the dyers, who employ it both fresh and dried.

"The seeds are usually sown after barley is taken off the ground in autumn, or it is very commonly sown with barley in the spring; but the first mode is the best, because the plants make some progress the first year, and in the following season they will be twice the size of those sown in the spring.

"After the ground has been well ploughed and harrowed, the seeds should be sown broadcast, of which one gallon is sufficient for an acre. Unless the ground be very poor, it will not require any dung. The best crops, however, will be the result of drilling and cultivating the crop alone. The drills may be a foot apart, and the plants six inches distance, in the rows. The plants should be kept clear of weeds by hoeing.

"When seeds are required, a small portion should be left standing for the purpose, and the plants should be pulled up as the seeds ripen. The whole crop may be cleared off before the time of sowing wheat, which is the best crop to follow dyers' weed.

"The crop is taken by pulling the entire plant; some pull it when in flower, others pull it earlier; the last appears to be the best. In the execution of the work, the plants are drawn up by the roots in small handfuls, and set up to dry, after being tied with one of the stalks; sometimes, however, they become sufficiently dry without being set up, by turning. These, after they have been completely dried, are tied up into bundles and sold by the name of Weld-cord.

"The demand for it is sometimes very little, while at others it is so great as to raise the price to a high degree.

"The herb is sometimes gathered green, and treated like woad or indigo; but in general the dried herb is used by the dyers in a state of decoction. The chief disease of weld is the mildew, to which it is very liable when young; and this is one reason why it is often sown with other crops\*."

\* Don's Miller's Dictionary.

**THE MIGNONETTE.**—(*Reseda odorata*)—This sweet-scented flower is a native of Africa, and although it is regularly grown as an annual, it will survive the winter if kept in the greenhouse, and flower again with great freedom in the spring if it be not allowed to seed.

When grown in the open borders, the seeds merely require sowing as recommended for hardy annuals in general, vol. i. p. 18; but if grown in pots to place in the house, the following directions may be necessary :—

1. *Times of Sowing.*—With regard to this, all depends upon the time it is wished to have it in flower. If for blooming in January and February, the seed should be sown in the third week in August; if to flower in March and April, sow the first week in September; if for May and June, sow in February; if for July, August, and September, sow the first in April; if for October, November, and December, sow the last week in July.

2. These five sowings require somewhat different treatment, according to the season when each sowing is made.

3. *August and September Sowings.*—The two sowings for early flowering require considerable care, or they are liable to perish by mildew.

4. The pots in which the seeds are sown should be plunged or placed in a frame, on a slight hotbed a foot and a half high, made of leaves or anything that will give a gentle heat for a short time:

5. Give the frame a good elevation at the back; fix it on a south aspect, and place the pots not more than a foot from the glass.

6. Fill the pots with a mixture of three-fourths of light maiden loam, taken from the top spit of a pasture field, and one fourth clean sand.

7. Always give a good drainage, for any deficiency in this will invariably injure, if not destroy the crop.

8. Keep the frame close shut down until the plants begin to make their appearance, then gradually expose them to the air, in fine weather, and as they advance in growth, allow them as much air as possible when the weather is not frosty, but carefully cover them with mats at night when the weather is severe.

9. When the plants are half an inch high, thin them out, leaving eight or ten only in each pot.

10. Water with caution, and never suffer them to be exposed to rain, but allow the soil to become quite dry before any water be given, and then give it sparingly, always selecting a fine day for the purpose, that the plants may have the benefit of a little air afterwards to dry their leaves.

11. When about an inch and a half high, stop the leading shoot of each plant, to induce them to throw out side branches.

12. *February Sowing*.—These pots must be placed in a frame, as recommended for the last; but they do not require so much caution with regard to watering, &c., because they derive more benefit from the sun than those sown in autumn; and if plenty of air be admitted in fine weather, and they are safely preserved from frost, there is little danger of them perishing. These may also be exposed occasionally to gentle showers after the plants are an inch high.

13. *April Sowing*.—The seeds sown now require still less care than the last; the pots need not be placed in a frame, but on any warm sheltered border, where they will merely require the common care of hardy annuals.

14. *July Sowing*.—To be successful in this sowing, plunge the pots up to the rim in the ground; this prevents the soil from becoming over-dry, or the roots from being injured by the excessive heat of the weather.

15. Towards the end of September or beginning of October, the pots must be taken up and placed in a frame, and from thence to the situations where they are intended to flower.

16. *Sizes of Pots*.—The proper sized pots for all the sowings are upright 48's.

17. *Water* always with care, except when the plants are in flower, at which time they require a good supply.

18. *TREE MIGNONETTE*.—(*R. odorata frutescens*).—This plant does not appear to be a distinct variety, for the common mignonette, kept in the greenhouse and properly trained, becomes half shrubby, and in every other respect, as far as our observations have gone, is without any character by which it may be distinguished from the *frutescens*: Our plants at Chatsworth are two feet or more high on the stem, and at the top form a good bushy head.

19. Sow seeds of the common mignonette in March, or make use of some of the plants of the February sowing.

20. The pots most suitable for sowing the seed, to form the tree mignonette, are upright 32's, which are about five inches wide at top, and about six inches deep.

21. Place the pots in a melon or cucumber frame where there is a good moist heat, carefully admitting air to them as soon as they are up.

22. When they have made about four leaves, or are nearly an inch high, thin out all the plants except two, one of which must be after-

wards pulled up ; but it is better to leave them both growing until the danger of damping off is over.

23. As each plant advances in growth, pick off all the side shoots, leaving the leaf at the base of each shoot to assist in the growth of the plant.

24. When the plants are drawn up, by plenty of heat and moisture, to the height of about a foot, they will begin to show flower ; the flowers, however, must be nipped off, and all side shoots be removed as they appear.

25. About a week after the flowers have been nipped off, remove the plants to the greenhouse, where they should have less water but plenty of air. Carefully tie each to a thin stick with bass matting.

26. After a time each will begin to send out another shoot from near the top, which must be led up the stick, and all side shoots again nipped off, but the bottom leaves again left to assist the growth of the stem.

27. The plants will now have attained to their proper height, from eighteen inches to two feet high ; again cut off the bloom when it appears, and continue to keep the plants in the greenhouse.

28. In autumn they will put forth plenty of shoots from the top, and make a handsome bush, and will come into flower early in February, or March, according to the heat in which they may have been kept.

All the other annual species of *Reseda*, as *linifolia*, *Chinensis*, *Mediterranea*, &c., merely require to be sown in the open ground, and treated as other annuals—Vol. i, page 18.

The biennial species, as *alba*, *lutea*, &c., may be treated as recommended,—Vol. i. page 66.

The shrubby species are all tender plants, and although they will flower very freely in the open air during summer, it is indispensable that they be sheltered in winter, either in a greenhouse or frame. They are readily increased by cuttings of the half-ripened wood, planted in light sandy soil, and plunged in a gentle heat. They also produce seeds, which should be sown in March.

## ARTICLE IX.—NEW AND RARE PLANTS,

FIGURED IN THE PERIODICALS FOR MARCH.

## CLASS I.—PLANTS HAVING TWO COTYLEDONES.

## CAMELLIÆ.

**CAMELLIA JAPONICA Fordü.**—This splendid variety was communicated to us by Messrs. Lucomb Price and Co., Nurserymen, Exeter, by whose relative the late Mr. Wm. Ford, (a well known and most successful cultivator of Camellias,) it was raised from seed; and out of respect to whose memory Messrs. L. P. & Co. have very properly named it. It is undoubtedly one of the most perfectly formed Camellias that has hitherto been produced. Nothing can exceed the regularity and symmetry of its petals, and the exquisite tint of its delicate rose coloured flowers; the foliage is remarkably fine, and the style of growth is good. It is highly pleasing thus to find our native varieties, rivalling any of those imported from China.—*Paxton's Mag. of Bot.*

## COMPOSITEÆ

**BELLUM CRASSIFOLIUM,** Thick-leaved Lesser Daisy.—This pretty little Daisy is a native of Sardinia, where it was discovered by Lignor Moris, Director of the Royal Botanic Garden at Turin, who gave it the name. It was introduced to our Collections in 1832. The plant is well suited to ornament rock-work, being quite hardy, and fond of a dry situation. It is easily increased by cuttings and seeds.—*Brit. Fl. Gard.* 278.—Flowers are white with a yellow disk.

## ACANTHACEÆ.

**RUELLIA ELEGANS,** Neat Blue-flowered Ruellia. This very pretty species of Ruellia, is cultivated in the stove of the Glasgow Botanic Garden, having been raised from seeds sent from the East Indies. Its bright blue blossoms continue during great part of the summer, and render it an acceptable plant to our collections.—*Bot. Mag.* 3389.

## CLASS II.—PLANTS WITH ONLY ONE COTYLEDON.

## ORCHIDÆÆ.

**CATASETUM PURUM,** Spotless Catasitum. This is one of the best characterized of all the Cataseta; and although introduced to the Liverpool Botanic Garden more than eight years ago, it appears to be still a rarity in our collections. It is a native of Brazil, whence it was imported by Charles Horsfall, Esq.—*Bot. Mag.* 3388.

**ONCIDIUM TRIQUETRUM.** Triquetrous-leaved Oncidium.—Although introduced from Jamaica to the Royal Gardens of Kew by Rear Admiral Bligh, so long ago as the year 1793, a figure of this beautiful plant never before appeared in any work, from which it may perhaps be inferred, that the species was soon lost to our gardens. It has, however, been again introduced by Charles Horsefall, Esq., from the same country. The petals are white, tinged with pale green, and variously spotted with purple, and the column yellow, which gives the flower a very handsome appearance.—*Bot. Mag.* 3393.

#### ASPHODELEÆ.

**TRITOMA BURCHELLII.** Burchells Tritoma.—This is a beautiful perennial plant, quite hardy. It was introduced from the Cape of Good Hope, by Mr. Burchell, after whom it has been named. Increased by offsets, which are plentifully produced, *Bot. Reg.* 1745.

#### AMARYLLIDÆ.

**ZEPHYRANTHES SPOFFORTHIANA.** Spofforth Zephyranthes. — This is an hybrid production from the *Z. tubispatha*, which has white flowers, fertilized by the pollen of the *Z. carinata*, which has large red flowers. It is in every respect intermediate.—*Bot. Reg.* 1746.

### RURAL AFFAIRS.

ARTICLE X.—ON FOREST-TREES, WITH REFERENCE TO THEIR PICTURESQUE BEAUTY.—(*From Gilpin's Forest Scenery.*)

BY VIOLA.

IN the November number, page 483 of the *Register*, the reader will find the commencement of a series of extracts from the above work, which would have been followed by further quotations in the ensuing months, if unforeseen circumstances had not prevented their appearance.

After having detailed the requisites, which form the picturesque beauty of the oak; our author proceeds to enumerate those adventitious circumstances attending the tree, which contribute to its general effect. Speaking as a painter, he exclaims,—“What is more beautiful, for instance, on a rugged foreground, than an old tree with a *hollow trunk*, or with a *drooping bough*?

From the *withered top* also, great use and beauty may result in the composition of landscape; when we wish to break the regularity of some continued line, which we would not entirely hide. \* \* \* The *curtailed trunk* discovers the whole; while the lateral branches vigorous and healthy in both, hide any part of the lower landscape, which, wanting variety, is better veiled. \* \* \*



Whether these maladies in trees ever produce beauty in *adorned nature*, I much doubt. Kent was hardly enough to *plant a withered tree*; but the error was too glaring for imitation.

Objects in every mode of composition, should harmonise; and all we venture to assert is, that these maladies are their only sources of beauty, either in their wild scenes of nature, or in artificial landscape, when they are the appendages of *some particular mode of composition*.

The most beautiful of these diseases, is *moss*,—the green which tinges the trunk of the beech; the sulphur colored, and black, which stain the oak; and the yellow, which is frequently found on the ash, and elm, are amongst the most beautiful of those tints that embellish the bark of trees. There is too, a white moss, which is considered a certain mark of age; and when it prevails in any degree, is a clear indication that the tree is declining. We find also another species of moss of a dark brown colour; another of an ashy hue; and another of dingy yellow; touches of red, and sometimes, though rarely,—a bright yellow, like a gleam of sunshine; many of these, however, are lichens and liverworts; but all these excrescences, under whatever names distinguished, add great beauty to trees, and when they are blended harmoniously, as is generally the case, the rough and furrowed trunk of an old oak, adorned with these pleasing appendages, is an object that will long detain the picturesque eye.

The *blasted* tree has often a fine effect, both in natural and artificial landscape. When a dreary heath is spread before the eye, and ideas of wildness and desolation are required, what more suitable accompaniment can be imagined, than the blasted oak,—ragged,—scathed,—and leafless,—shooting its peeled white branches athwart the gathering blackness of some rising storm? Thus the poet treats it,

“As when Heaven’s fire  
Hath scath’d the forest oak, or mountain pine,  
With singed top, its stately growth, tho’ bare,  
Stands on the blasted heath.”

*Ivy*, and other parasitical plants,—climbers, and other appendages, are beautifully described, and he proceeds thus:—

“The rooting of trees also, is a circumstance on which their great beauty depends; old trees often leave their roots above the soil; and the effect is certainly very picturesque. The more they raise the soil around them, and the greater the number of radical knobs they heave up, the firmer they seem to establish their footing upon the earth, and the more dignity they assume. An old tree rising tamely from a *smooth surface*, (as we often find it covered with earth in artificial

ground) loses half its effect; it does not appear as the lord of the soil, but to be stuck into it; and would have a still worse effect on canvas, than it has in nature. \* \* \*

Among deciduous trees, the oak presents itself first. It is a happiness to the lovers of the picturesque, that this noble plant is as useful as it is beautiful. From the utility of the oak, they derive this advantage, that it is every where found. In the choice indeed of its soil, it is rather delicate; for though it is rather undistinguishing, during its early growth, while its horizontal fibres straggle about the surface of the earth; yet when its top root begins to enter the depths of the soil, perhaps no tree is nicer in its discriminations. If its constitution be not suited here, it may multiply its progeny indeed, and produce a thriving copse; but the puny race will never rise to lordly dignity in the forest, nor furnish navies to command the ocean.

The particular, and most valued qualities of the oak, are *hardiness* and *toughness*. Shakespeare uses two epithets to express these qualities, which are perhaps stronger than any that we can find.

‘Thou rather with thy sharp and sulphurous bolt  
Split’st the *unwedgeable* and *gnarled* oak,  
Than the soft myrtle”

Many kinds of wood are harder, as box and ebony; many kinds are tougher, as yew and ash: but it is supposed that no species of timber is possessed of both these qualities together, in so great a degree as British oak. Almost all arts and manufactures are indebted to it; but in ship-building, and bearing burdens, its elasticity and strength are applied to most advantage. I mention these *mechanic uses* only, because some of its *chief beauties* are connected with them. Thus, it is not the erect stately tree that is always the most useful in ship-building; but more often the crooked one, forming short turns and elbows, which the shipwrights and carpenters call *knee-timber*. This too is generally the most picturesque. Nor is it the straight tall stem, whose fibres run in parallel lines, that is the most useful in bearing burdens; but that whose sinews are twisted and spirally combined. This too is the most picturesque. Trees under these circumstances, generally take the most pleasing forms. Now the oak perhaps acquires these different modes of growth from the different strata through which it passes. In deep rich soils, where the root meets no obstruction, the stem, we suppose, grows stately and erect; but when the root meets with a rocky stratum, a hard and gravelly bed, or any other difficulty, through which it is obliged in a zigzag course to pick its way, and struggle for a passage,

the sympathetic stem, feeling every motion, pursues the same indirect course above which the root does below : and thus the sturdy plant, through the means of these subterraneous encounters and hardy conflicts, assumes form and character, and becomes in a due course of centuries, a picturesque tree.

February 8, 1835.

## NATURAL HISTORY.

### ARTICLE XI.—PECULIARITIES OF PLANTS.

(Continued from Vol. 2, page 459.)

OUR last remarks related to those plants possessing the property of entrapping insects by their irritability, we now come to others equally if not more destructive to the insect race, by having their stems, leaves, or flowers, or all three, covered with a viscous liquid : the insects settling upon such are unable to escape, every struggle entangling them more than the last.

Amongst these may be enumerated the *Robinia viscosa*, *Calceolaria viscosa*, several species of *Silene*, Sweet Briar, Common Moss Rose, and the *Fraxinella*. The Moss Rose has not only a stem thickly covered with the viscous liquid, [but possesses a mossy coat, which, when not disfigured by dead insects, is, in every body's estimation, a great addition to its beauty. This beautiful variety is said to have been raised quite accidentally, by planting a common *provençe rose* in a very damp and shady situation ; and it has been thought by some persons that any rose may be made mossy, by constantly keeping it in the shade, and where the air is very damp for want of ventillation. This opinion we can by no means agree to, as a general rule, whatever might be done in a solitary instance.

Who does not know that after a hot dry day, the Common *Fraxinella* emit a resinous vapour, which will readily take fire, and burn freely, if a candle be introduced to it, without destroying the plant.

But leaving the subject of the *fly-catching properties* of plants, and viewing their peculiarities and metamorphoses, the mind is led to things exceedingly curious. Many of the movements of plants are purely mechanical, others cannot be attributed to mechanism, because they are attended with phenomena exactly resembling muscular contractility in animals.

The *Hedysarum gyrans* is constantly in motion. These motions are thought to be connected with respiration. In the Tiger Lilly, the pistillum will bend first towards one stamen and then towards

another, until it has received the pollen from nearly all. In *Saxifraga* and *Parnassia*, the same motion takes place with the stamina. The sensitive plant is very remarkable in its motions. The sleeping and waking of many plants are remarkable. M. Dutrochet has made some experiments by way of ascertaining the cause of so remarkable a phenomenon. A translation of the same is inserted in the *Field Naturalist*, Vol. 1, page 3, which is as follows :—

“I took three leaves of the kidney-bean, which I shall call A, B, C. The leaf A was put into water, and kept during a quarter of an hour in vacuo, on restoring it to the air, the air cavities were entirely filled with water. The leaf B remained also a quarter of an hour in vacuo, but without having been immersed. The leaf C remained in its natural state. I put the stalks of these three leaves into vases filled with water, which I exposed to a full strong light. In the evening the leaf A, first exhibited the phenomenon of depressing its leaflets, or of sleep; the leaf B exhibited this phenomenon later; and the leaf C later still.

The next day, the leaf C first presented the phenomenon of straightening its leaflets, or of waking; the leaf B next awoke; and last of all the leaf A. But the cessation of sleep in the two latter was incomplete; their leaflets remained during the whole day in a state of drowsiness, and they made no movement of nutation towards the light. The leaf C on the contrary, not only straightened its leaflets completely, which constitutes the act of waking, but it inclined the upper side towards the window which admitted the light, which constitutes the act of nutation.

On the evening of the second day, the leaf A was again the first to show the phenomenon of sleep; it was followed by the leaf B, and lastly by the leaf C: the latter ceased at the same time to keep the upper side of its leaf-stalk inclined towards the window; the nutation ceased during the night, and the leaflets resumed their natural position.

On the third day, the leaf A presented no symptoms of waking, and began to wither, the leaf B revived in a trifling degree, but it continued drooping; the leaf C perfectly alive, performed its functions as usual. On the fourth day, the leaf A was dead; the leaf B began to fade, and was dead the next day: the leaf C continued to live some time.

These experiments demonstrate to us, that the sleeping and waking of plants, and their nutation, depend on the air which is contained in their air-organs, and is in proportion even to the quantity of that air.

# MISCELLANEOUS INTELLIGENCE.

## ARTICLE XII.—QUERIES AND ANSWERS.

**ON FERNS, IN ANSWER TO A SUBSCRIBER.**—A subscriber who enquires in your last number, page 74, for some account of Ferns, is informed that in Maund's Botanic Garden, for this month, he will find a description of four Ferns which I have never before seen figured. A letter to the author of that work will, doubtless elicit further information. If he does not succeed, I will transmit him a list, and such particulars as I am able. FELICES.

**MINING INSECT, ON THE ROSE TREE.**—There is a little insect which by its mining, causes the leaves of the Rose Tree to be streaked with little white lines ; pray can you tell me the name and habits of the insect, and whether it is injurious to the plant in any degree ?

WM. SIMPSON.

**QUERIES ON FOUNTAINS.**—If you could illustrate your Work now and then with a few specimens of handsome playing fountains in flower gardens, and for other places, you would confer an obligation upon many of your readers, who have long been making enquiries on this subject, and who would be very glad if you would give the names of several gentlemen, who are now in England, and considered eminent in the art of hydraulics. The French and Italians study this science more than the English, perhaps you could give the names of some of those authors. About ten years ago a Mr. Philipsthall, a Swiss gentleman, was lecturing in various counties in England, on this beautiful and wonderful science ;—he gave some of the most delightful and astonishing specimens of what could be accomplished,—even a fine Scotch mist, which many clever gardeners say cannot be made by art, but very *desirable* in many hot-houses. W. GARDENER.

**REPLY TO M. D. ON THE PERSIAN MELON.**—I offer my apology for the neglect of attention to the question proposed to me at page 409, of vol. 3. I conceived that I had replied to it ; my mind having confused the initials of W. D. with those of M. D.

I do not perceive any error in the practice described ; the mere circumstance of training downward from the back of the pit, could not, I should think, cause the fruits to crack ; the accident must have arisen from unscreened solar action, I should conceive, for I have frequently seen melons of the old kinds, burst very suddenly for want of shade, between the hours of eleven A. M. and three P. M. One fact is certain, I never observed a crack or flaw in any *Persian*

*variety*, whether screened or not, although I grew on one occasion eight or nine pots of Housainees and Ispahans in a small stove which were in no way shaded, otherwise than by their own foliage. The roots struck from the bottoms of the pots into a bed of leaves, and the foliage reposing upon a trellis overhead, converted the upper part of the house, for several feet, into a perfect bower. I frequently had 90 to 103 deg. at mid-day. .

Last year I saw a three-light pit of large dimensions, completely covered with plants of Ispahan and striped Housainee, raised by a clever melon grower, from seeds produced by myself. Neither bottom heat, nor external linings were employed. All was health and luxuriance from May to September. I think that from fourteen to twenty melons were yielded; some six or seven pounds. Not a crack or injury was visible. The plants grew in leaf mould chiefly, though either a portion of road sand or light loam had been added some time before. In fact, the gardener had not cleared out his pit for several seasons, and the radical processes of a previous crop of one kind or other, or the exudation from the roots, had manured the soil for another, and a different crop. The melon vines ran *on* the soil, but the fruits were supported upon bricks.

Wood-lice have often perforated and gnawed melons. Is it possible that the seeming cracks might be erosions of those mischievous insects?

Good loam must be a health-supplying medium to the melon plant, but perhaps the sward with grass remaining on it, chopped very fine, and enriched with one-third of pure black-leaf mould, or peat would be better. Let M. D. try again, and not be anxious about bottom heat. Let him screen with a mat, or an old bunting flag during the strongest solar influence, and I think he will succeed. A trellis certainly could do no injury: but my recent observations have satisfied me, that the Persian tribe can be grown in the common way. I believe that, if we except the fine, oval, *large* green-fleshed melon (which, surely, approaches to the *Persian*,) the *Housainee* of *each variety* and the *Ispahan*, are of more hardy constitution than any of the thick-rined varieties of Europe.

THE AUTHOR OF THE DOMESTIC GARDENER'S MANUAL.

## ARTICLE XIII.

## COLLECTIONS AND RECOLLECTIONS.

TEMPERATURE OF THE SUN.—That the temperature at the visible surface of the sun, cannot be otherwise than very elevated, much more so than any artificial heat produced in our furnaces, or by chemical or galvanic processes, we have indications of several distinct kinds: 1st, From the law of decrease of radiant heat and light, which, being inversely as the squares of the distances, it follows, that the heat received on a given area, exposed at the distance of the earth, and on an equal area at the visible surface of the sun, must be in the proportion of the area of the sky, occupied by the sun's apparent disc to the whole hemisphere, or as 1 to about 300,000. A far less intensity of solar radiation, collected in the focus of a burning glass, suffices to dissipate gold and platina in vapour. 2dly, From the facility with which the calorific rays of the sun traverse glass, a property which is found to belong to the heat of artificial fires in the direct proportion of their intensity.\* 3dly, From the fact, that the most vivid flames disappear, and the most intensely ignited solids appear only as black spots on the disk of the sun, when held between it and the eye.† From this last remark it follows, that the body of the sun, however dark it may appear when seen through its spots, may, nevertheless, be in a state of most intense ignition. It does not, however, follow of necessity that it must be so. The contrary is at least physically possible. A perfectly reflective canopy would effectually defend it from the radiation of the luminous regions above its atmosphere, and no heat would be conducted downwards through a gaseous medium increasing rapidly in density. That the penumbral clouds are highly reflective, the fact of their visibility in such a situation can leave no doubt.

This immense escape of heat by radiation, we may also remark, will fully explain the constant state of tumultuous agitation in which the

\* By direct measurement with the actinometer, an instrument I have long employed in such enquiries, and whose indications are liable to none of those sources of fallacy which beset the usual modes of estimation, I find that out of 1000 calorific solar rays, 816 penetrate a sheet of plate glass 0.12 inch thick; and that of 1000 rays which have passed through one such plate, 859 are capable of passing through another.—*Author*.

† The ball of ignited quicklime, in lieutenant Drummond's oxy-hydrogen lamp, gives the nearest imitation of the solar splendour which has yet been produced. The appearance of this against the sun was however as described in an imperfect trial, at which I was present. The experiment ought to be repeated under favourable circumstances.—*Author*.

fluids composing the visible surface are maintained, and the continual generation and filling in of the pores, without having recourse to internal causes. The mode of action here alluded to, is perfectly represented to the eye in the disturbed subsidence of a precipitate, as described in Art. 330., when the fluid from which it subsides is warm, and losing heat from its surface.

The sun's rays are the ultimate source of almost every motion which takes place on the surface of the earth. By its heat are produced all winds, and those disturbances in the electric equilibrium of the atmosphere which give rise to the phenomena of terrestrial magnetism. By their vivifying action, vegetables are elaborated from inorganic matter, and become, in their turn, the support of animals and of man, and the sources of those great deposits of dynamical efficiency, which are laid up for human use in our coal strata. By them the waters of the sea are made to circulate in vapour through the air, and irrigate the land, producing springs and rivers. By them are produced all disturbances of the chemical equilibrium of the elements of nature, which by a series of compositions and decompositions, give rise to new products, and originate a transfer of materials. Even the slow degradation of the solid constituents of the surface, in which its chief geological changes consist, and their diffusion among the waters of the ocean, are entirely due to the abrasion of the wind and rain, and the alternate action of the seasons; and when we consider the immense transfer of matter so produced, the increase of pressure over large spaces in the bed of the ocean, and diminution over corresponding portions of the land, we are not at a loss to perceive how the elastic power of subterranean fires, thus repressed on the one hand and relieved on the other, may break forth in points when the resistance is barely adequate to their retention, and thus bring the phenomena of even volcanic activity under the general law of solar influence.

The great mystery, however, is to conceive how so enormous a conflagration (if such it be) can be kept up. Every discovery in chemical science here leaves us completely at a loss, or rather, seems to remove farther the prospect of probable explanation. If conjecture might be hazarded, we should look rather to the known possibility of an indefinite generation of heat by friction, or to its excitement by the electric discharge, than to any actual combustion of ponderable fuel, whether solid or gaseous, for the origin of the solar radiation.\*—*Herschell in Lard. Cab. Cyclop.*

\* Electricity traversing excessively rarefied air or vapours, gives out light, and doubtless, also heat. May not a continual current of electric matter be con-



**THE MOON.**—In the annual circuit of the earth about the sun, it is constantly attended by its satellite the moon, which revolves round it, or rather both round their common centre of gravity : while this centre, strictly speaking, and not either of the two bodies thus connected, moves in an elliptic orbit, undisturbed by their mutual action, just as the centre of gravity of a larger and smaller stone tied together and flung into the air describes a parabola as if it were a real material substance under the earth's attraction, while the stones circulate round it or round each other, as we choose to conceive the matter.

If we trace, therefore, the real curve actually described by either the moon's or earth's centres, in virtue of this compound motion, it

stantly circulating in the sun's immediate neighbourhood, or traversing the planetary spaces, and exciting in the upper regions of its atmosphere, these phenomena of which, on however diminutive a scale, we have yet an unequivocal manifestation in our aurora borealis. The possible analogy of the solar light to that of the aurora, has been distinctly insisted on by my father, in his paper already cited. It would be a highly curious subject of experimental enquiry how far a mere reduplication of sheets of flame, at a distance one behind the other (by which their light might be brought to any required intensity,) would communicate to the heat of the resulting compound ray the penetrating character which distinguishes the solar calorific rays. We may also observe, that the tranquillity of the sun's polar, as compared with its equatorial regions (if its spots be really atmospheric,) cannot be accounted for by its rotation on its axis only, but must arise from some cause external to the sun, as we see the belts of Jupiter and Saturn, and our trade-winds, arise from a cause, external to those planets, combining itself with their rotation, which alone can produce no motions when once the form of equilibrium is attained.

The prismatic analysis of the solar beam exhibits in the spectrum a series of "fixed lines," totally unlike those which belong to the light of any known terrestrial flame. This may hereafter lead us to a clearer insight into its origin. But before we can draw any conclusions from such an indication, we must recollect, that previous to reaching us, it has undergone the whole absorptive action of our atmosphere, as well as of the sun's. Of the latter we know nothing, and may conjecture every thing ; but of the blue colour of the former, we are sure ; and if this be an inherent (i. e. an absorptive) colour, the air must be expected to act on the spectrum after the analogy of other coloured media, which often (and especially light blue media) leave unabsorbed portions separated by dark intervals. It deserves enquiry, therefore, whether some or all the fixed lines observed by Wallaston and Fraunhofer may not have their origin in our own atmosphere. Experiments made on lofty mountains, or the cars of balloons, on the one hand, and on the other with reflected beams which have been made to traverse several miles of additional air near the surface, would decide this point. The absorptive effect of the sun's atmosphere, and possibly also of the medium surrounding it (whatever it be,) which resists the motions of comets, cannot be thus eliminated.—*Author.*

will appear to be, not an exact ellipse, but an undulated curve, like that represented in the figure to article 272, only that the number of undulations in a whole revolution is but thirteen, and the actual deviation from the general ellipse, which serves them as a central line, is comparatively very much smaller, so much so indeed, that every part of the curve described by either the earth or moon is concave towards the sun. The excursions of the earth on either side of the ellipse, indeed are so very small as to be hardly appreciable. In fact, the centre of gravity of the earth and moon lies always within the surface of the earth, so that the monthly orbit described by the earth's centre about the common centre of gravity is comprehended within a space less than the size of the earth itself. The effect is nevertheless, sensible in producing an apparent monthly displacement of the sun in longitude, of a parallactic kind which is called the menstrual equation; whose greatest amount is, however, less than the sun, horizontal parallax, or than 8. 6".

The moon, as we have seen, is about 60 radii of the earth distant from the centre of the latter. Its proximity, therefore, to its centre of attraction, thus estimated, is much greater than that of the planets to the sun; of which Mercury, the nearest is 84, and Uranus 2026 solar radii from its centre. It is owing to this proximity that the moon remains attached to the earth as a satellite. Were it much farther, the feebleness of its gravity towards the earth, would be inadequate to produce that alternate acceleration and retardation in its motion about the sun, which divests it of the character of an independent planet, and keeps its movements subordinate to those of the earth. The one would outrun, or be left behind the other, in their revolutions round the sun, (by reason of Kepler's third law,) according to the relative dimensions of their heliocentric orbits, after which the whole influence of the earth would be confined to producing some considerable periodical disturbance in the moon's motion, as it passed or was passed by it in each synodical revolution.

At the distance at which the moon really is from us, its gravity towards the earth is actually less than towards the sun. That this is the case, appears sufficiently from what we have already stated, that the moon's real path, even when between the earth and sun, is concave towards the latter. But it will appear still more clearly if, from the known periodic times in which the earth completes its annual and the moon its monthly orbit, and from the dimensions of those orbits, we calculate the amount of deflection, in either, from their tangents, in equal very minute portions of time, as one second.

**PREDICTIONS OF THE WEATHER.**—There is nothing more common than to predict the future state of the season, from some single appearance in the early part of it, and yet there is nothing more unphilosophical or fallacious. An early blossom, an early bee, or an early swallow, or the early appearance of any other appearance of nature, is no evidence whatever of the kind of weather that is to come, though the belief that it is so is both very general and very obstinate. The appearance of these things is the effect of the weather, not the cause; and it is what we may call an external effect; that is, it does not enter into the chain of causation. The weather of to-day must always have some influence upon the weather of to-morrow; but its effects will not be altered in the smallest tittle, whether it does or does not call out of the cranny in which it has been hybernated, some wasp, or some swallow that was too weak for the autumnal migration. Birds, blossoms, and butterflies, do not come in expectation of fine weather; if they did, the early ones would show that they see not far into futurity, for they generally come forth only to be destroyed. They come in consequence of the good weather which precedes their appearance; and they know no more of the future than a stone does. Man knows of to-morrow only as a rational being; and were it not that he reasons from experience and analogy, he would have no ground for saying that the sun of to-day is to set. The early leaf and the early blossom of this spring may be a consequence of the fine weather of last autumn, which ripened the wood, or forwarded the bud; and the early insect may be evidence that the winter has been mild: but not one of these, or any thing unconnected with plants or animals, taken in itself, throws light upon one moment of the future; and for once to suppose that it does, is to reverse the order and cause of effect, and put an end to all philosophy—to all common sense.

And are we to draw no conclusions from the phenomena of plants and animals, which have been popular prognostics of the weather from time immemorial; not from the face-washing of the cat, or the late roasting of the rook, which have been signs infallible time out of mind? No, not a jot from the conduct of the animals themselves; unless we admit that cats and crows have the keeping and commanding of the weather. These actions of theirs, and very many (perhaps all) phenomena of plants and animals, are produced by certain existing states of the weather; and it is for man to apply his observation, and find out by what other states these are followed. The cat does not wash her face because it is to rain to-morrow; that, in the first place, would be "throwing philosophy to the

cats;" and, in the next place, it would be doing so to marvellously little purpose, inasmuch as, if puss were thus informed of the future, she would only have to wait a day in order to get a complete washing without any labour or trouble. When the cat performs the operation alluded to, it is a proof that the present state of the atmosphere affects her skin in a way that is disagreeable, and the washing is her mode of relief; and, in as far as the cat is concerned, that is an end to the matter. Man, however, may take it up, and if he finds that in all cases, or in the great majority of cases, this happens only before rain, he is warranted in concluding that the state of the atmosphere, which impresses this action upon the cat, is also the state which precedes rain; and that in the cases where the rain does not follow, there has been a sudden atmospheric change, which is also worthy of his study. What it is in this case, and whether connected with the little action in the fur of the animal, by which electricity can be excited, we shall enquire; but in the late roosting of the crows [rooks] the cause is apparent: they feed upon larvæ and earth-worms; these, especially the latter, come most abroad in the evenings before rain; and as most animals gorge themselves where food is easily found, there is no reason why rooks should not follow the general law.

These familiar instances have been noticed, in order to point out how apt we are to miss the lesson that nature would give, and break down the fabric of philosophy, by giving a purpose and a prescience of the future to that which cannot reason. The appearance and first songs of birds are, like all other seasonal phenomena, part of the history of the year, and of value retrospectively in telling what has been, though not of the smallest use in telling what is to be.—*Mudie.*

# PAXTON'S HORTICULTURAL REGISTER,

MAY, 1835.

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## ADDRESS.

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It will be seen by a notice on the wrapper of the last number of this periodical (April, 1835), that the editorial duties have fallen into new hands. This circumstance it is necessary to state for the information of the subscribers; and to reiterate what Mr. Paxton has given as the reason for his relinquishment of the task; namely, an extreme pressure of business, which entirely deprives him of the leisure necessary to conduct the Register as his readers have a right to expect of him. This change will, however, make no alteration either in the character or plan of the work; for though Mr. Paxton is no longer editor, his advice will still regulate, and his contributions still enrich its pages.

The Horticultural Register has now been nearly four years before the public, during which its circulation has increased to a much greater extent than was, at its commencement, anticipated. This success may be attributed to its cheapness; to the value and variety of the practical matter contained in its pages; but chiefly to the increasing fondness for reading felt by practical men, and the desire for information on all subjects connected with gardening, which prevails among all classes. This is evident from the great number of periodicals on subjects connected with horticulture, which have sprung up within the last few years, and from the numerous botanical and horticultural works almost daily issuing from the press.

It may, perhaps, seem difficult to keep up an interest in a periodical

work, limited in its objects ; but the science of gardening is but imperfectly understood, and new discoveries are constantly being made, throwing light on its practice, which would be lost or unapplied, were there not works of this kind in existence, to register and make them known. Hardly a week passes but some new plant is introduced, some new fact established, either at home or abroad, a knowledge of which is not only desirable but necessary to all engaged in the *practice* of gardening. It is perhaps the most useful feature in works of this nature, that they are open receptacles for registering new discoveries, improved practices, and noticing new objects. They are also records of the various opinions of readers, as well as free arenas for candid criticism and temperate discussion ; thereby guarding sound practical knowledge from the contamination of hasty conclusions or inconsiderate error. And as it often happens that highly useful discoveries are made in obscure places, and by individuals who may have the wish, though no convenient and appropriate channel through which to make their discoveries known, they offer a fitting place for their communications, however imperfectly written, to appear, and gratify both the reader and writer.

Besides the different branches of the art of gardening, namely, the culture of fruits, flowers, and culinary vegetables, together with that of trees, whether for use or ornament, and expositions of the principles of landscape-gardening, there are many other topics which require to be noticed in a miscellaneous work like this, such as garden architecture—or all structural expedients for preserving plants and maturing fruits—meteorology, geology, and other branches of natural history, on which success in gardening so much depends. Whatever also is going on among our horticultural brethren, far and near ; whatever is excellent in books, either as extracts from old, or reviews of new publications, will here be recorded. A calendar will be appended to each number, detailing the labour required in the fruit, flower, and vegetable departments, observations on the weather, and a meteorological register.

Finally, the Editor earnestly solicits the contributions of all classes ; and he believes that, carefully keeping in view the objects here slightly hinted at, his industry and experience will enable him to render the Horticultural Register as complete a monthly remembrancer as its limits will allow.

## HORTICULTURE.

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ON THE CERTAIN EFFECTS OF FROST, AND THE PROBABLE EFFECTS  
OF THE SUN'S RAYS ON THE EARLY FLOWERS OF FRUIT TREES.  
—BY THE EDITOR.

THE protection of the flowers of our wall fruit-trees requires from the manager as much attention and labour, as the pruning and training of them. The superior sorts, as grape-vines, peaches, nectarines, and apricots, being natives of warmer climates than that of Great Britain, require, in our culture of them, every assistance which can be afforded, as well by shelter against frosts and violent winds as by the accumulated heat of the sun inducted and reflected from the face of a wall to which the branches of the trees are usually trained. By these means an artificial temperature is obtained, which is found sufficient for bringing their fruit to a high degree of perfection.

As the apricot, peach, and nectarine are early flowering plants, and frequently in bloom before the winter is over, much care is necessary to protect the delicate and easily injured flowers from frost. The most common expedients for this purpose are finishing the top of the wall with a coping of stone, or tiles made on purpose, so as to project over the front face, which thereby prevents the perpendicular descent of cold air, or, as it is explained by some meteorologists, checks the radiation of heat from the surface of the ground at the bottom of the wall, over which the coping projects. That a coping is quite effectual in many instances is well known ; but it is liable to two objections urged against the use of it, namely, it prevents the cleansing and refreshing effects of vernal and summer showers, so necessary for the repulsion of insects ; and it is no defence at all against currents of frosty air which sweep along, or which are impelled directly against the face of the wall. This defect of copings has suggested other expedients, namely, temporary screens, either of wood or of canvas, stretched on light frames, and attached by hinges to, and under the ordinary over-silling course of brickwork at the top of the wall, and which screens are let down to admit rain, or raised to repel frost, as circumstances may require. A third very simple and old-fashioned scheme is fixing small boughs of evergreen shrubs or trees, either by shreds, or stuck behind the branches at different heights over the flowering parts of the tree, which prove a very efficient protection against frost. Old fishing nets, or woollen nets manufactured for this express purpose, are both and commonly used

with the same view. But by far the best screens for the security of wall-trees, are made of ships' old colours, or curtains made of the same kind of stuff (bunting). These, hung on hooks or staples at the top of the wall, and so contrived as to be let down or drawn up by brails\* at pleasure, are perfectly safe, and easily managed as well against frost as for another purpose, to be alluded to presently.

It is quite unnecessary to notice the other and more expensive expedients had recourse to for the protection of the flowers and earlier maturation of the fruit of those foreign trees in this country, as hot walls, paper-covered, and glazed frames, so well known to every gardener; but we may revert to that state of the air so injurious to those early flowering trees experienced in this country, and to which they are not subject in their own. The action of frost on these attenuated and delicate members of a flower, and which, in fact, destroys them, is commonly supposed to arise from the expansive force of the congealed fluids bursting the cells and vessels containing them, and so destroying the organisation. The two most essential parts of a flower are the stamens and stigma, both of which are composed of purely cellular membrane, and the latter, wholly divested of cuticle, and when perfect always moist, must necessarily be quickly frozen; and, moreover, as the style is simple and filiform, this (even if the stigma, from the viscid consistence of its moisture, should escape,) must very soon also be injured. These parts of the flower then being ruptured, are useless, and no perfect fruit can possibly be produced.

This being the usual consequence of frost on the flowers of plants, renders necessary the precautions for their defence above adverted to. The necessity of giving support and shelter by placing the trees against walls, also operates injuriously by inciting the trees into action sooner in the spring than is wished; and therefore whatever retards the flowering is of service, by lessening the risk of the bloom being hurt by late frosts. The best practice, as regards this point, is to unnailed all the flower-bearing shoots from the wall early in November, allowing them to jut loosely from it all winter, and until pruning time, which need not be performed till the flowers are just ready to expand. This removal gets the shoots out of the strongest heat reflected from the wall, and consequently delays their flowering. There is one thing, however, which should regulate the time when peach, nectarine, and apricot trees should be unnailed: if the young bearing wood be well ripened, the sooner the unnauling is performed the

\* Lines having one end fixed at the top, and passing down behind, and under the lower edge of the curtain, and carried up on the outside and passed through an eye-bolt or staple at the top, and again brought down to the hand. This pulled, draws the curtain to the top.



better ; but if the young shoots continue growing, the unnauling should be delayed till after the growth ceases.

Let us now advert to the effects of strong light and the direct beams of the sun on flowers. Of these, many appear to rejoice and expand under the morning light and solar rays, as the convolvulus, crocus, and many of the compositæ. Others only expand under the sun's direct action, as the anagallis, and which will close its flowers in a few minutes if a passing cloud only happens to intervene ; almost all are fugitive under bright sunshine ; and a few shun the sun's light altogether, as the night-blowing cereus and some of the fig-marigolds.

It is observable that the flowers of most delicate structure are mostly *early*, or *twilight flowerers* ; such are those belonging to the Linnæan classes, *Icosandria* and *Polyandria* ; and it would appear that this precocity of flowering, and this constitutional shyness of strong light and heat, is really a provision of nature bestowed for the greater safety of the products.

The native countries of the fruit-trees under consideration enjoy a temperate spring, and frost is seldom felt, so that the flowers are never in jeopardy from cold ; but the summers are excessively hot, and the solar heat is often aggravated by the withering sirocco, in which an Icosandrious flower would be parched and killed in a few minutes. But, it may be answered, we have no such visitations in Britain. True, not in the same degree certainly ; but we sometimes experience effects of the like kind ; for instance, buck-wheat (*Polygonum fagopyrum*) is extensively cultivated in some of the light land districts in the south of England, and much more commonly in Holland and Belgium. It is sown about the beginning of June, and is ripe in October. The flowers are small and exceedingly delicate. Should the weather be *dark and showery* during its flowering season, a great yield is the consequence ; but if the weather be bright and dry while the plants are in flower, a very light crop follows. In some places cherry orchards are attached to every farm ; the fruit being a considerable source of profit in favourable seasons. If when the trees are in flower the weather be cloudy, with frequent showers of rain, plentiful crops follow ; but with dry and clear skies the reverse. Many kinds of hardy fruit trees are found from experience to be much more fruitful on an east or west, or even on a north aspect, than on one directly facing the south, particularly pears, plums, and cherries. And we have often witnessed that where some of the earliest varieties of pears, as the Petit Muscat, and Jargonelle ; of apples, the red and white Juncating ; and of plums, the Italian Damask and Précoce de Tours, have been preferred to stations on the south wall to get the fruit

for table as early as possible without actual forcing ; they have invariably been less prolific than the same kinds in cooler situations.

The foregoing observations are only intended as an introduction to the practical inference to be deduced from them, and that is, that it is highly probable *as many fruit-trees are occasionally barren, and as much fruit lost by ardent sunshine and heat reflected from a south wall, as there is lost by the ordinary attack of frost.* This idea we have elsewhere \* propounded to practical men, who may put it to the test of experiment by employing some easily applied kind of shading from ten o'clock in the morning of bright days till three in the afternoon, to trees in flower ; and which attention, if bestowed for a short time, even on a single tree, would soon prove whether any practical advantage be derivable from such precaution. Where curtains of bunting are employed, dropping them during the heat of the day would have the best effect in qualifying intense heat, or mitigating parching winds. Indeed, the first idea we had of the necessity of shade as well as shelter being requisite for wall fruit-trees, was gained by seeing an abundant crop of apricots once preserved by small ivy boughs stuck over a tree, which proved at once both a shelter and a shade ; the ivy not being removed till the fruit were as large as mazagan beans.

At the moment we are writing (7th April), wall fruit-trees are mostly in bloom ; but such is the equable state of the weather, with a clouded atmosphere, that there is neither danger from frost on nights, nor sun-burning by day : and should such weather continue for another month, judging from the present appearance of the trees, heavy crops may be expected.

Before this paper is published it is most likely that all wall fruit-trees will be out of flower, so that those readers who agree in our conclusion may not have opportunity this season to put it to the test ; but the subject is well worth consideration, and should not be forgotten. The flowers of the grape-vine are very delicate, and were they not partially shaded by the early and ample foliage, would certainly suffer from the drying sun and wind ; but the vine being self-protected needs less manual assistance than other trees, whose flowers appear before the leaves.

\* " Illustrations of Vegetable Physiology."

ON THE EFFECTS AND ADVANTAGE OF TRAINING THE SHOOTS OF  
YOUNG PEAR-TREES DOWNWARDS.

BY MR. M. SAUL, OF LANCASTER.

I THINK the mode of return-training of fruit-trees is not generally known in this part of the country. I believe Dr. Lingard was the person who directed my attention to the plan, about three years ago. I had at that period received a few valuable cuttings of choice pears from the Horticultural Society of London, and was, of course, desirous of having fruit from them. I grafted them upon young, healthy, bearing trees, on which they took well. In the second year I turned and confined the shoots in a downward position, as at fig. 1. At the present time, the third spring from grafting, the shoots so trained are as full of flower-buds as possible, and give promise of a crop of fruit. The sorts so treated are the Easter Beurré, and the Beurré Rance.



Fig. 1.

In order to prove the effect of downward training, compared with the common way of allowing the shoots to grow upright, two other grafts were worked on healthy trees, one of which has grown up in the natural way, as fig. 2, and, to my great surprise, not a flower-bud is to be seen upon it. This, in my opinion, is sufficient proof that grafting on bearing trees, and training the first shoots downwards, is the quickest way of obtaining specimens of new sorts of fruit.



Fig. 2.

*Sulyard Street, Lancaster.*

## ON THE CULTURE OF OXALIS CRENATA.

TO THE EDITOR OF THE HORTICULTURAL REGISTER.

SIR,—In answer to my question (vol. iii. p. 486, by C. M. W.) in the last number of the Register, he says, if I dig up the plants about Christmas I shall find plenty of tubers, and even if I have not done so before I see his answer I shall then find a good supply of tubers. Now I beg C. M. W.'s pardon when I state that it is well known the *Oxalis Crenata* will not stand frost—no, not so much as the potato. And

does he mean to say that it will produce tubers after the tops are destroyed by frost, or is his meaning this, that the small tubers which are formed before the plant is destroyed will after that period continue to grow and produce "a good supply of tubers?" He says it is the habit of the plant to produce its tubers late. Undoubtedly it is. He says some small tubers were planted in the open ground in April which produced upwards of twenty each at the end of December. Now he does not say whether he took them up as soon as the plants were destroyed, or whether he had any frost at all; neither what sort of soil he planted them in, but only that if I put them in about the beginning of April, and dig them the latter end of December, I shall "doubtless find a supply of tubers."

The other writer on the subject (p. 86) says, that manure is not required, the poorer the soil the better, "as they will be very luxuriant the first five or six years." Now, how does he come to that conclusion? is it from experience, or is it only from supposition? The latter I should think to be the case, as it is not that number of years since it came to this country. And again, he says it is "not an early vegetable, but will become earlier in the course of *five or six years*." I should like to know how they will be earlier the seventh year than they will be the fourth, or how they will be more luxuriant the fourth than they will be the seventh. He says the manner of culture very much resembles that of the potato—that may be. Allowing, for argument, that is so, supposing he takes a potato of any sort, late or early, and plants it at a certain time for five or six years; I ask him, will it be any earlier (or, I should have said, its produce,) than when he began to plant it? It is nonsense to talk about changing the nature of a late potato into an early one, or *vice versâ*; the habit may be changed by being forced, or earlier planted, or even the season may be so favourable as to produce its tubers a fortnight sooner, aided by a good soil and situation. I do not mean to say, that potatoes, forced or grown under favourable circumstances, will, in the year following, be another fortnight earlier. No, I say that the season may aid to an early maturity, so that we cannot possess an early variety without raising new varieties from seed. So it is with the *Oxalis*; it is late in producing its tubers, and will continue so till new varieties be raised from seed; he says to earth it up with poor dry earth mixed with lime rubbish. Now, if it be such a poor vegetable it is not worth the trouble, far less the expense of earthing and mixing, and further adding poor soil to that already impoverished, or, as one would say, not possessed of the proper *stamina*. He says, to cause the plant to swell the tubers, as soon as the flowers drop off, the stems must be taken in the hand and

turn them round two or three times. Now, I ask what plant will stand such a twist as this? even some sorts of willows will not stand it, far less a plant possessed of so much succulence as the *Oxalis Crenata*. He says hot cinders will thoroughly do them. Now, if this twisting does not thoroughly do them, I do not know what will.

I am sorry for your omission of the plan of building the bed for forcing asparagus, as you promised. I am afraid it will be too late in April, as the plants are rather more forward than usual; but if you think it will be in time next month, be pleased to insert them in your instructive Register.

G. E. I.

*March 4, 1835.*

#### ON THE COILING SYSTEM OF VINES IN POTS.

BY MR. J. MEARNS, F.H.S., GARDENER TO HIS GRACE THE DUKE OF PORTLAND, WELBECK, NOTTS.

YOUR readers will no doubt be desirous to know how the coiling system of propagating the grape-vine goes on. At every attempt it is still more prosperous. I have one of this season with a most promising crop of nineteen bunches of the white Frontignan. I have a great many in pots coiled last March, which will produce me from 700 to 800 fine bunches, and in all, about ninety vines in pots and boxes, which will produce about 1000 bunches of grapes this year; and the bunches are as fine as you could desire under any method of cultivation, and will be matured in the greatest perfection. Many are at this time nearly ripe.

You have not forgotten my notice to you last season, of a rootless shoot of the same season producing thirty-five bunches; the object was attained by stopping, so as to induce a second show of fruit, and they were all perfectly ripened. The vine is still in the box, and broke as luxuriantly, and showed as fine as I ever saw upon any vine; it developed seventy-eight bunches, and I have retained thirty-six, which, I have no doubt, will be as fine of the kind (*Purple Constantia*) as can be. It is astonishing how well all the varieties of the Muscat of Alexandria bears, set and swell, by the pot culture. The sceptical Mr. Grey, I think, would be struck dumb if he were to see them, and I should be most happy to see him if he would pay me a visit; I fancy he would become a convert to the pot culture of grapes.

I have found that the best method to propagate the vine is from pieces of the old wood instead of the young. I cut off lengths of three

or four years' old wood from six to ten or more inches, and after denuding them of all warty excrescences, besides that at the apex, I bend them horizontally round the inside of the pot, using as small a size at first as I can safely bend them into, so as to give me the chance of frequent shifting, and place them in bottom heat. When a shoot arises, it comes up like a strong asparagus bud, and soon has abundance of fine roots, with a great reservoir of food to support it. When it has grown to the height of eight or ten inches I pinch off the top, and then all the laterals, till I induce a principal eye to burst, which I lead *upwards*, divesting it of *all* laterals and tendrils, till it is five or six feet long, before I again top it; if it be of the desired strength, but if not, I top at two or three feet, according to its strength, till I have got the strength required, which the plant soon gains, in consequence of the number of active and vigorous roots. When the pot is full of roots, re-pot it, and afterwards it will do well without placing again in bottom heat.

I have some muscats at this time, from cuttings of last spring, that will weigh two pounds each bunch, and one of those has fifteen bunches upon it; it showed forty bunches. I have some Chasselas d'Arbois that I expect to weigh two pounds per bunch, in pots, and this is but the second season. I received a few cuttings of the Chasselas Musqué from the London Horticultural Society this time twelve months, and one of those has at this time six fine formed bunches on it.

The Candia variety of muscat, of which I received a shoot for coiling last season, and *then* produced me two fine bunches and ten plants! will produce me fourteen or fifteen bunches this year, and, I have no doubt, in the highest perfection.

What a pity that so *simple*, cheap, and successful a method of cultivating the grape is not practised in pots more generally. A more regular and certain supply of grapes can be kept up, and at a much less expense in machinery than it is possible to do by the diffused method of culture, and with the choicest and best kinds.

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#### ON PREVENTING THE ATTACK OF INSECTS AND MILDEW, &c. ON WALL AND OTHER FRUIT-TREES.

BY SENEX.

It is a very old proverb, that the prevention is better than the cure of a malady. This applies to the disorders of the vegetable, as well as to those of the animal kingdom. The former are liable to disease from predisposing causes, as well as the latter. Atmospheric influences

affect both ; and both require defences against attack, or the application of some remedy after the attack.

Plants are preyed on by insects and by parasites of their own kind ; both disfigure and destroy the organisation. Whatever the disease or enemy be, it is much more injurious in the early stages of the annual growth of trees than after the foliage and wood have gained a firmer consistence ; and therefore the earlier a preventive or remedy is applied, the more effectual it is likely to prove.

It is perfectly well known that the eggs of the insects which are such an annoyance in gardens during the spring and summer, are laid on, or very near the plants which yield their progeny food. These eggs are deposited in regular or irregular clusters on the bark, and particularly round the bases of the buds. When examined in this state the eggs appear to be glued together and covered by some exudation from the parent, which at once conceals, secures, and preserves the little embryos till the warmth of the spring brings forth the tender leaves or flowers and the puny larvæ together. At first the larvæ of moths are very minute caterpillars, and soon as they have burst their investments instinctively crawl to the bursting bud, where they rest and feed. The little grey moth (*Yponomenta padella*) is one of the smallest but most numerous of its tribe. We have often had to regret the extensive damage committed by this tiny caterpillar, particularly on the foliage of nonpareil apple-trees in a sheltered orchard ; not a leaf escaped, and though the fruit were not preyed on, they were useless, having neither juice nor flavour. The economy of this insect has never been more minutely studied and described than by Mr. R. H. Lewis, in a late number of the *Transactions of the Entomological Society of London*. Mr. Lewis states that "the mother moth deposits her eggs generally on small twigs, and chiefly on their under surface, in a circular patch about a line and a half in diameter, which she covers with a strong gluten, at first of a pale yellow, but which is afterwards, by the action of the atmosphere and rain, changed to a dark brown, very closely resembling the bark of the tree, and is then very difficult to be distinguished from it. The eggs hatch early in autumn, and the larvæ remain in confinement during the whole winter, under the covering which is formed by the gluten and egg-shells. If one of these nests be opened it will be found hollow, and containing from twenty to thirty pale-coloured larvæ, with head and a spot on the shoulder black. In these receptacles they increase somewhat in size : the bark of the tree beneath is moist and green, but whether they derive any nourishment from it the writer cannot tell. About the time the trees are coming into leaf they make their escape, but they do not now com-

mence spinning webs; they cannot then eat the epidermis of the leaves, and they require some protection from the cold and rain, which their tender frames are not yet fitted to endure; to effect which they mine into the leaves, eating the parenchyma only, and leaving the cuticle untouched. Having acquired sufficient strength to bear the changes of weather, and eat every part of the leaves, they make their way out; and the anxious gardener, who has hitherto only observed the brownness of the leaves caused by the mining, but which is attributed to the blasting effects of an easterly wind, is astounded to see myriads of caterpillars swarming on the trees, disleafing every branch as they proceed. The fact of their mining sufficiently explains the reason of their sudden appearance; it shows how, in one day, not a single caterpillar may be visible on the trees, and the next they may be swarming with larvæ of so large a size as to rebut the idea of their having been recently hatched. Besides, their latter habit of feeding on the leaves externally is so little like their former one of feeding on them internally, that any one who has not satisfied himself by examination that both habits are proper to the same caterpillars would scarcely suppose this to be the case. While the caterpillars are within the leaves they are of a yellowish colour, though they become darker at each change of skin. It is in this state that Mr. Lewis advises their destruction by gathering and burning every leaf which shows their internal depredations. Their nests are so difficult to discover, that searching for them seems out of the question; and if a wash strong enough to dissolve their glutinous covering were applied, it would probably at the same time injure the tree. Having eaten their fill, they prepare for the pupa state, by spinning strong cocoons of a long oval shape. In a short time they come forth in their perfect winged form, and may be seen on mornings and evenings flying in great numbers round the devoted trees which are in the following year to be the scene of similar ravages, unless circumstances for which we cannot account should prevent their multiplication."

This same little moth is also partial to the foliage of the hawthorn; whole hedges may be often seen stripped of leaves, and covered by the webs of the caterpillars. The same or other sorts of larvæ mine the leaves of the lilac, cow-parsnep, and several other plants.

I have thought well to transcribe the principal part of Mr. Lewis's paper, not only because it is a very satisfactory account of the *Yponomeuta padella*, but because it conveys an excellent idea of the breeding and various transformations of moths in general; I would further observe, that his mode of destruction, though effectual as far as it goes, strikes me as impracticable. To gather every infected leaf would be a



tedious business, except only on very small trees, which happen to be under both the eye and hand. But it is worth consideration whether or not it be possible to cover the fruit trees on which the insects lay their eggs by some liquid which would offend and drive them from the garden and orchard into the fields, where they do but little harm. This liquid, whatever it may be, while it offends the mother moths, must not spoil or taint the fruit, because it should be applied while the insects are in their cocoons, and that is, when the fruit are on the trees, say in August or September. But all circumstances considered, perhaps the best time to assail this moth, and all other insects infesting fruit-trees, is just before and at the time they begin to move in quest of food. If, at that time, the trees were thoroughly sprinkled or repeatedly washed with some liquid which would either be fatal or offensive to the caterpillars, a check would be given on their first irruption, which, if it did not diminish their numbers, might drive them from their prey.

The aphides are one of the plagues of gardeners. These insects are viviparous in warm weather and oviparous in cold. In the first the nymphs come forth naked, in the second they are brought forth covered with a thin glutinous slough, which serves to attach them to the place where they are laid, and to shelter them during winter. In the spring they burst their thin covering, and creep to the summit of the shoot on which they passed the winter, there congregating to breed and feast on the juices of the plant. The aphid is doubly injurious, not only by extracting the juices, but by soiling the leaves, and especially the fruit, with honey-dew emitted by them.

Every gardener knows how to banish the green flies (*aphides*) after they appear, by fumigations of tobacco, either in frames, houses, or in the open garden, with the assistance of a fumigating cloth; but preventing their choosing a plant to live and breed on is a desideratum among cultivators, and yet to be discovered. Perhaps the means of prevention are simple, and near at hand, did we but know them. Every decoction offensive to the human palate has very probably been tried by one practitioner or another, but, as far as my knowledge goes, without success. There are two difficulties in the way: the first is, plants, in a state of growth, are ever producing new parts, grateful to the insects, however offensive the old parts may be; and, secondly, they are furnished with wings in one stage of their life, by which they can transport themselves whither they list. To overcome these difficulties requires a daily, or at least a very frequent application of the protective means—a laborious inconvenience quite impracticable. Still there is no doubt, but that if a tree could be made offensive to the

mother flies in the autumn, but few aphides would present themselves in the spring.

The best, cheapest, and easiest procured liquid for defending and cleansing fruit-trees from insects is common soap-suds from the laundry. I have always used this waste water for all kinds of trees, whether on walls or standards, employing the force of the garden engine. The bitter of the alkaline principle, and the clogging effect of the greasy matter on the movements of minute insects, if not fatal, is certainly offensive to all kinds inhabiting walls or trees. Besides, the cleansing effect of such a liquid thrown on with force gets rid not only of insects but many other impurities, and the trees always appear to be refreshed and invigorated by it. And it may easily be conceived, that stems and branches coated with the white curdlings of the soap, and the opening scales of the buds repeatedly filled by the same, must make the bark of the one and the interior of the other very disagreeable retreats, whether for board or lodging. The only time in the season when such an application is unsuitable will be during about six weeks before the fruit begins to ripen, as certainly no taint of the soap should remain on the fruit.

This application is available, useful, and even necessary on another account. It is a mortal enemy to the parasite fungus called mildew; and not only prevents the attack if timely applied, but kills the fungus, and recovers the wounded bark in a very short time. Some gardeners add a little of the flour of brimstone in the remedy for the cure of mildew—an useful addition, as it is equally destructive of this pernicious fungus.

Soap-suds is equally efficacious in banishing the little acarus, commonly called the red spider, so detrimental to fruit-trees and many other plants grown in a high temperature. In forcing-frames and houses they are a great pest, and are also met with on wall-trees in summer. They thrive and increase wonderfully in a dry atmosphere, and are greatly annoyed by moisture of any kind; and in some cases, when water or steam would be hurtful to certain plants, the acarus can only be banished by fumes of sulphur evolved from a strongly-heated flue or chafing-dish; but wherever water can be copiously and forcibly applied this little insect cannot thrive to be seriously hurtful.

It is well to know how the enemies of the gardener are to be met and vanquished; and when they do molest, it is necessary to check or destroy them: but it deserves the particular attention of every one engaged in the business to hit upon some plan of prevention rather than wait to perform a cure. Among your readers there are doubtless many who are good entomologists; and who have, from the very nature

of their business, the best opportunities of studying the economy of the insects which abound in gardens. Their economy once known, it may appear that in some one stage of their life they may easily be destroyed by some very simple means, but of which we are now ignorant, merely because we are not well enough acquainted with their habits and history.

SENEX.

April 10th, 1835.

## GARDEN ARCHITECTURE.

ON THE VARIOUS FORMS AND CHARACTERS OF ARBOURS AS OBJECTS OF USE OR ORNAMENT, EITHER IN GARDEN OR WILD SCENERY.

BY R. MALLET, ESQ., OF DUBLIN.

AN arbour is a space covered and enclosed by the interweaving branches of trees and reticulated stems of climbing plants, generally but not necessarily situated in the midst of garden scenery, and intended to afford shade and retirement. The words *arbour*, and *bower*, are, properly, very distinct; the former, alone, designating the subject of the present article; and the latter, which is not derived from '*bough*,' or any analogous word, meaning simply any small chamber—yet they are used almost indiscriminately by the best writers. Thus Milton—

“ ——— alone they passed

On to their blissful *bower*: it was a place  
Chosen by the sov'reign Planter, when he fram'd  
All things to Man's delightful use; the roof  
Of thickest covert was inwoven shade,  
Laurel and myrtle, and what higher grew  
Of firm and fragrant leaf; on either side  
Acanthus, and each odorous bushy shrub,  
Fenced up the verdant wall; each beauteous flower—  
Iris all hues, roses, and jessamine,  
Reared high their flourished heads between, and wrought  
Mosaic: underfoot the violet,  
Crocus, and hyacinth, with rich inlay  
Broidered the ground—more coloured than with stone  
Of costliest emblem.”

Morning comes at length—

“ So all was cleared, and to the fields they haste.  
But first, from under shady *arborous* roof, &c. &c.”

This citation is over long, if merely to prove that the words are used in common ; but it will be pardoned, as containing the “beau ideal” of an arbour, from one who was no mean judge of the beautiful.

Arbours, often found formed by the hand of Nature, and needing but little to render them delicious retreats, are of the highest antiquity ; their luxury could be more valued in a warmer climate than ours, and, accordingly, we find the peaceful days of Solomon described in the Sacred Text by the characteristic phrase, that “Judah and Israel dwelt safely every man under his vine, and under his fig-tree, from Dan even to Beersheba.” In the gardens of the luxurious Romans under the empire, it formed the favourite retreat of their hours of pleasure.

Thus Horace—

“ Est qui nec veteris pocula Massici,  
Nec partem solido demere de die  
Spernit : nunc viridi membra sub arbuto  
Stratus, nunc ad aquæ lene caput sacre.”

CARM., Lib. i. Od. 1, v. 20.

And again,

“ Simplici myrto nihil allabores,  
Sedulius curo : neque te ministrum  
Dedecet myrtus, neque me sub arcta  
Vite bibentem.”

CARM., Lib. i. Od. 38, v. 5.

The same author seems to indicate that the *laurel* was not an unusual arbour plant in his time.

“ Tum spissa ramis laures fervidos  
Excludet ictus.”

CARM., Lib. ii. Od. 15, v. 9.

And as the bay (*Laurus nobilis*) thrives and grows to an astonishing height in Italy, as, for instance, that in the Borromæan Islands, on the Lago Maggiore, on which Napoleon inscribed the word “Battaglia,” the evening before Marengo, which is upwards of sixty feet in height, it seems probable that it was this plant that was used. To the present day, Italy is a land of bowers ; the vines, all over the country, either hang festooned between the elms—as when Virgil wrote his *Georgics*—or are trained horizontally on flat trellises, to catch and intercept the sun, and thus form continual arbours : but we anticipate—to trace with laborious minuteness the history of arbours, would not be in place here ; we therefore proceed to consider the various species of arbours, their modes of construction, the proper materials for their formation, their various styles, and their suitable localities.

Arbours may be divided into such as are purely natural, partly natural and partly artificial, and such as are entirely the result of art.

Of the first are those formed by the banyan fig, in tropical countries, whose lateral and wide-extended branches send down numerous roots which fix themselves in the ground, becoming stems, and forming

A pillared shade with echoing walks between.

Such are those formed by our various weeping varieties of forest trees: the weeping ash, birch, beech, elm, willow, citysus, &c., &c. (Figs. 1 and 2.)



FIG. 1.

These with their lithe and tenuous branches waving with every summer breeze, and as here and there they sometimes part their textile



FIG. 2.

boughs, and letting in the flickering sun-beam, chequer the verdant

floor with light and shade, are the most truly natural, and, perhaps, the most delightful of any kind of arbour.

To the second kind belong all those which are formed by the hand of man, aided by some natural suitability of circumstances, or accidental advantages. Thus an aged forest tree may have some appropriate climbing plant, placed at its root, so as to run through its branches and foliage, and ultimately descend gracefully from their extremities, until it nearly touches the ground, as in Fig. 3.



FIG. 3.

The vast hollow trunk of an aged oak may be mantled with ivy, or with honeysuckle, and block seats placed within. To this order, likewise, belong those which are made by enclosing a space of any desirable form, perhaps circular, with the trunks of trees, choosing those which are roughest and most moss-grown, fixing them firmly in close array in the ground, and closing in the arched top with their branches. Various climbing plants may then be planted at their bases on the outside; amongst which ivy, in its varieties, should not be forgotten: these will soon cover over the whole with a dense envelope of foliage and flowers, while within amongst the roots of the trunks, and the block seats, primroses, violets, ferns, and other plants that love shade, and even some small American plants, will thrive. (Fig. 4.) The construction of this kind of arbour depends much on the chances of situation, and many designs or minute instructions would be, therefore, superfluous.

Arbours of the third kind are now but little used, indeed are scarcely to be seen in this country. They were usually formed with much attention to architectural outline of wood, or iron or copper wire trelliage; in the construction and arrangement of which much skill

and money were often lavished. They seem to have had their origin in Italy, and thence to have passed into France. Lyster, in his travels,

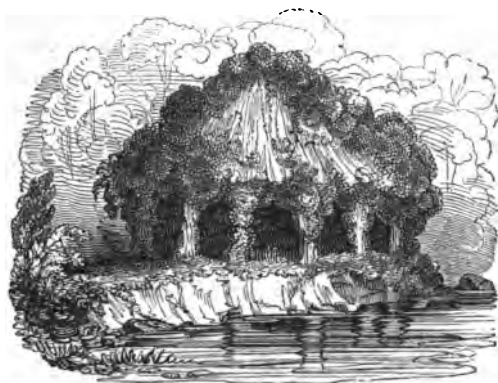


FIG 4.

*anno* 1698, gives descriptions of many which he saw. In the garden of the Hôtel d'Aumont, he says, "the trelliage at the upper end of the garden was very well adorned with *gilding*, and had in the middle a pavilion in which was an old Roman statue of a young man, &c. &c."

In the Hôtel Pelletier, "the garden here was very neat with a trelliage at the end, after the manner of a triumphal arch. In two niches were placed great iron vases, or flower pots, and right before the middle a basin of water, which was set playing for our entertainment. Along the walls were planted abele trees, whose tops were disposed upon an iron trelliage into arches at equal distances, &c. &c. The best piece of trelliage of iron bars and wood intermixed, is in the garden of Monsieur Louvois. The whole upper end is adorned with a noble trelliage, after the manner of a triumphal arch: it cost a great sum of money. There are four statues disposed on pedestals under it; on one side of the trelliage is an aviary well stored with birds, &c."

We are also informed that pots of *Sédum pyramiddale*, vases of iron with double red and striped stocks in them, and ranunculus, brought at great price from Constantinople, formed distinguished ornaments of these arbours.

In his description of the gardens of St. Cloud, he says, "There are many arbours of trelliage, pavilions, &c. of iron mixed with wood, painted green, with honeysuckles running up to them." The tree most in use here was the small-leaved horn-bean, which serves for arcades, berceaux, &c. The *marronnier*, or horse-chestnut is chiefly

used for shady walks. He also says that vast urns, or vases of *trelliage*, filled with some plant growing within them, and clipped to their form, formed a common accompaniment to the trelliage arbour.

These dry quotations show what was the style of arbour then in use, in which little alteration has since been made. The expense that was then gone to, however, in the gilding and decoration of these trelliages, was incredible. Lystor mentions two which cost sixteen thousand livres.

The object in this was, that as during the severe winter, and the height of summer, the trelliage was nearly laid bare by the frost, or by the parching sun ; so it was important to make it look well, even then.

Fig. 5 is an example of the old French and Italian arbour.



FIG. 5.

The best and handsomest arbours of this class that we have seen, are those in the gardens of the Duke of Baden at Schweitzingen, between the Rhine and the Maine. These gardens, attached to the ancient castle of the Marquesses of Baden (now only used as a hunting lodge), are of considerable extent, and are filled with a profuse variety of ornament, in a mixed style, between the old French and the German.

The great garden area immediately behind the castle, is laid down in a great circle, divided into various grass plots, fountains, basins, &c. &c., all of respectable magnitude: the semi-circumference of the circle, next the castle, is surrounded by hothouses, which form its extreme wings ; but the remote semi-circumference is entirely surrounded by a broad walk, covered by an arched wooden trelliage, with equi-distant arched openings all along the sides, these at one side permit a free view of the great circle with all its varied garniture, while at the other they open into a succession of close and secluded *bowers*.

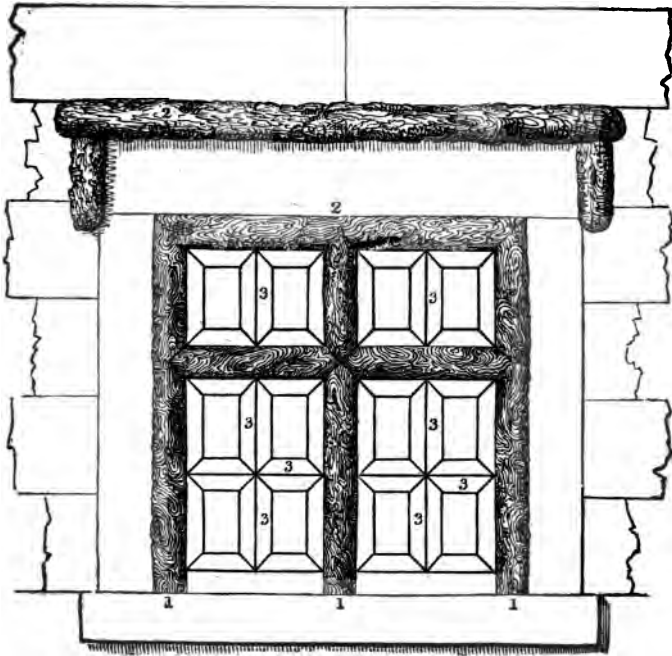
The whole is uniformly and luxuriantly covered with the Virginian creeper (*Ampelopsis hederacæa*.)

(To be continued.)



## A RUSTIC WINDOW, SUITABLE FOR A GARDEN-HOUSE OR COTTAGE.

DESIGNED BY MR. M. SAUL, OF LANCASTER.



HEREWITH I send a drawing of my garden-room window, which I have lately erected, and which has a very pleasing effect, both from the garden and the public road. Thinking it might be worthy a place in the Horticultural Register, I forward it with the hope that others may be induced to admit rustic ornament for both doors and windows in garden architecture.

A very slight inspection of the sketch will give a sufficiently clear idea of the construction and appearance of the window. I selected the most curled and knotty pieces for the uprights, 1, 1, 1, and cross pieces, 2, 2, 2. The sash frame is made wider, to receive the width of the uprights and cross pieces, and which are about five inches in diameter. The shuts and slides are made in the usual way: the squares are formed with narrow lead, and in squares, in the same way as if they were one piece of glass; and by so doing, it is stronger than if it were all lead. The parts 3, 3, 3, 3, 3, 3, being painted black, makes it appear all lead.

*Lancaster, February, 1835.*

## BOTANY.

## ON THE STUDY OF THE SCIENCE OF BOTANY.

BY F. F. ASHFORD.

By the system of Linnæus, plants are disposed according to the number, proportion, and situation of the stamina and pistilla (the manner of this distribution shall be described hereafter; I shall at present only speak of the divisions of the system in general). The first grand division of the vegetable kingdom is into twenty-four classes; these classes are again subdivided into orders, and again into genera; every genus into species, and the species into varieties. The three first more immediately respect the theory of the science than the other two, which, though systematic divisions, have a nearer relation to the practice or practical part, as it is in these that the principal improvements in Horticulture and Floriculture are more particularly included.

As the classes and orders of the system will be separately treated of, I shall here give, as a commencement, a table, exhibiting at one view their titles in the order in which they stand in the system, so that the young botanical tyro may have recourse thereto, as he finds an occasion.

CLASSES.	ORDERS.
1. Monandria	2. Monogynia, Digynia.
2. Diandria	3. Monogynia, Digynia, Trigynia.
3. Triandria	3. Monogynia, Digynia, Trigynia.
4. Tetrandria	3. Monogynia, Digynia, Tetragynia.
5. Pentandria	6. Monogynia, Digynia, Trigynia, Tetragynia, Pentagynia, Polygynia.
6. Hexandria	4. Monogynia, Digynia, Trigynia, Polygynia.
7. Heptandria	4. Monogynia, Digynia, Tetragynia, Heptagynia.
8. Octandria	4. Monogynia, Digynia, Trigynia, Tetragynia.
9. Enneandria	3. Monogynia, Trigynia, Hexagynia.
10. Decandria	5. Monogynia, Digynia, Trigynia, Pentagynia, Decagynia.
11. Dodecandria	6. Monogynia, Digynia, Trigynia, Tetragynia, Pentagynia, Dodecagynia.
12. Icosandria	3. Monogynia, Di-pentagynia, Polygynia.
13. Polyandria	5. Monogynia, Digynia, Trigynia, Pentagynia, Polygynia.
14. Didynamia	2. Gymnospermia, Angiospermia.
15. Tetradynamia	2. Siliculosa, Siliquosa.
16. Monadelphia	7. Triandria, Pentandria, Heptandria, Octandria, Decandria, Dodecandria, Polyandria.

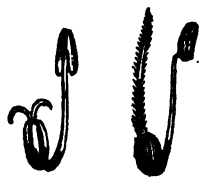
CLASSES.	ORDERS.
17. Diadelphia	4. Pentandria, Heptandria, Octandria, Decandria.
18. Polyadelphia	4. Decandria, Dodecandria, Icosandria, Polyandria.
19. Syngenesia	5. Polygamia æqualis, P. superflua, P. frustranea, P. necessaria, P. segregata.
20. Gynandria	3. Monandria, Diandria, Hexandria.
21. Monœcia	8. Monandria, Diandria, Triandria, Tetrandria, Pentandria, Hexandria, Polyandria, Monadelphias.
22. Dicœcia	14. Monandria, Diandria, Triandria, Tetrandria, Pentandria, Hexandria, Octandria, Enneandria, Decandria, Dodecandria, Icosandria, Polyandria, Monadelphias, Gynandria.
23. Polygamia	2. Monœcia, Dicœcia.
24. Cryptogamia	9. Filices, Equisetaceæ, Lycopodiaceæ, Marsileaceæ, Musci, Hepaticæ, Algæ, Lichenes, Fungi.

Having thus given an introductory table of the divisions of the sexual system for a reference, I shall now proceed to explain the meaning of the terms used for the titles of the classes and orders, and at the same time informing the young botanist how they may be distinguished from each other. As the terms used are all in the Greek language, from whence they are taken, they are all expressive of the principal circumstance that obtains in the class to which they are applied, the explanation of them will, of itself, give us a good insight into the proper characters of the several classes, and the sexual distinctions on which they are founded.

#### Classis I.—MONANDRIA.

*Monandria*, from *monos*, one, and *anēr*, a man. The word here compounded signifies a husband; so that this class bears bisexual flowers, furnished with one husband, i. e. one stamen, or male organ for generation.

This class, which is not large, contains chiefly exotic plants; and of these the tribe of *Scitamineæ* is considered one of the most beautiful families of the vegetable kingdom. The useful productions are chiefly the ginger, cardamon, and turmeric, spices highly esteemed, and in general use wherever they are known and can be procured. The *Salicornia*, a native of our own shores, is burned for kelp, and pickled for culinary purposes. Almost all the plants of this class are aquatics, or grow in marshes. Orders two, viz.



*Monogynia*, derived from *monos*, one, and *gyne*, a woman; flowers of one style; *Canna Indica*.

*Digynia*, *dis*, twice, *gyne*, a woman; flowers furnished with two styles; *Blitum capitatum*.

## Classis II.—DIANDRIA.

*Diandria*, from *dis*, two, and *anēr*, a man ; signifying that this class is furnished with bisexual flowers, of two husbands, or two stamens.



This class, which is not large, and so entirely artificial, that no other characters than those of the human definition can be assigned to it, contains some elegant and fragrant plants belonging to *Jasmineæ*, *Scrophularineæ*, and *Labiataæ*. Examples of the two latter orders are *Veronica* and *Salvia*, extensive genera, chiefly of hardy herbaceous plants. The most useful of this class are, the pepper (*Piper nigrum*), and the olive (*Olea*) ; the jasmine is used in perfumery ; the sage (*Salvia officinalis*), and rosemary (*Rosmarinus officinalis*), in cookery ; and the privet (*Ligustrum vulgare*), and *syringa*, for garden hedges. Orders three, viz.

*Monogynia* ; *Salvia fulgens*.

*Digynia* ; *Anthoxanthum odoratum*.

*Trigynia* ; *tris*, three, and *gyne*, a woman ; flowers furnished with three styles ; *Peperomia blanda*.

## Classis III.—TRIANDRIA.

*Triandria*, from *tris*, three, and *anēr*, a man ; meaning that this class bears bisexual flowers, furnished with three husbands, i. e. three stamens, or male organs for generation.



This class, which is larger than the two preceding, contains most of the genera of three considerable and very natural orders ; the *Irideæ*, *Cyperaceæ*, and *Gramineæ*. The first are chiefly bulbous-rooted, sword-leaved plants, with brilliant, but transient flowers ; the second sedgy, grass-like plants, more curious than useful ; and the third, the proper grasses, an order which contributes more extensively and effectually to the support of man and domestic animals than any other, and, unless we except *Lolium temulentum*, containing no poisonous plant. Orders three, viz.

*Monogynia* ; *Commelina tuberosa*.

*Digynia* ; *Stipa pennata*.

*Trigynia* ; *Lechea major*.

## Classis IV.—TETRANDRIA.

*Tetrandria*, from *tetra*, four, and *anēr*, a man; meaning that this class bears bisexual flowers, furnished with four husbands, or four stamens of equal length. (See Classis XIV.)



This class is neither so large or important as the last; it is composed chiefly of ornamental or curious plants, mostly shrubs, of which the *Proteaceæ* holds the first rank. Among the few plants used in the arts which it contains are, the madder (*Rubia*), Fuller's thistle (*Dipsacus*), the holly (*Ilex*), one of the best evergreen hedge-plants, and some foreign timbers and dyes, as the sandal-wood (*Santalum*), and chay-root (*Hedyotis umbellata*). Orders three, viz.

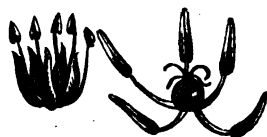
*Monogynia*; *Dryandra Baxterii*.

*Digynia*; *Buffonia tenuifolia*.

*Tetragynia*; *tetra*, four, and *gyne*, a woman; flowers furnished with four styles; *Sagina procumbens*.

## Classis V.—PENTANDRIA.

*Pentandria*, from *pente*, five, and *anēr*, a man; signifying that this class bears bisexual flowers, furnished with five husbands, or stamens.



One of the most extensive of the Linnean classes, and contains about a fifth part of all phænogamous plants. It includes the whole of the *Boraginæ*, *Asclepiadeæ*, *Apocynæ*, and *Umbelliferæ*, nearly all *Primulaceæ* and portions of a great variety of other natural orders, among which many are ornamental, and others valuable on account of their relation to medicine and the arts. The *Boraginæ* are, in many instances, ornamental plants; a few, such as *Anchusa tinctoria*, are applied to economical purposes; but the principal are mere weeds of northern latitudes.

*Asclepiadeæ* contains the curious genus *Stapelia*; and *Apocynæ* contains, among some poisonous plants (such as *Echitis venenata*), the oleander, remarkable for the beauty of its flowers, and the cream-fruit and picimons of Sierra Leone. Umbelliferous plants contain numerous species; some of which, like the *Cicuta virosa*, and *Conium macu-*

*latum*, are dangerous poisons ; and others, which are useful to mankind both as luxuries or necessities—the seeds of caraway (*Carum*), and coriander (*Coriandrum*), are used by the confectioner ; dill (*Anethum*), and anise (*Pimpinella anisum*), by the distiller ; the blanched stems of celery (*Apium*), and sweet fennel (*Anethum fœniculum*, var. *dulce*). *Primulaceæ* contains many handsome border-flowers and alpine plants.

This class contains also the elegant families of *Convolvulus* and *Ipomea* ; the various kinds of *Epacris*, which, in New Holland, rivals the heaths of South Africa ; and the splendid genus, *Azalea*. Orders six, viz.

*Monogynia* ; *Primula prænitens*.

*Digynia* ; *Artedia squamata*.

*Trigynia* ; *Turnera speciosa*.

*Tetragynia* ; *Parnassia palustris*.

*Pentagynia* ; *pente*, five, and *gyne*, a woman ; flowers furnished with five styles ; *Linum perenne*.

*Polygynia* ; *poly*, many, and *gyne*, a woman ; flowers furnished with many styles ; *Myosurus minimus*.

#### Classis VI.—HEXANDRIA.

*Hexandria*, from *hex*, six, and *anēr*, a man ; signifying that this class bears flowers that are bisexual, and furnished with six husbands, stamens, or male organs for generation. The flowers of this class must not be confounded with the 15th Class, which also bears flowers with six stamens. The distinction between the classes are these : in the 6th Class, the stamens are all of equal length ; in the 15th Class, the stamens are unequal, four being long and two short. (See Classis XV.)



(To be continued.)

## BOTANICAL INTELLIGENCE.

*Rhododendron arboreum*.—A very fine hybrid variety of this magnificent plant has been obtained by Mr. Knight, of the Exotic Nursery, King's Road, Chelsea. The flowers are collected in terminal heads, and the corolla is pure white, and as large as its prototype. The anthers protrude, and are of a deep red or crimson colour, and are beautifully relieved by the pure white petals, and altogether much more striking than the white variety or species of the *R. arboreum*.

*Magnolia conspicua*.—One of the finest specimens of this highly ornamental Chinese plant is now (5th April) in flower in Messrs. Malcolm and Co.'s nursery at Kensington. It is one of the first that was in the trade, and originally planted where it now stands, as a stool to propagate from, but has been allowed to grow up into a fine spreading bush, from ten to twelve feet high, and nearly as much in lateral extent. It now bears, by computation, two thousand flowers; and is, by far, the most conspicuous object, not only in that nursery, but of all the vegetable products of the country round.

Mr. Loudon, in the last number of his *Arboretum Britannicum*, says, that this plant was introduced by Sir Joseph Banks along with *Hydrangea Hortensia*, *Pæonia Moutan*, and *Rosa Indica*, about 1789. This is nearly correct; but the fact is, *M. conspicua* had been received both at Kew and Low Layton (where Mr. Slater's country seat then was) before, as well as immediately after that year; but the plants generally died from being sickly when received, and from being treated as stove plants after their arrival. Mr. Loudon does not mention the *Magnolia purpurea* (now *obovata*), an equally beautiful plant, though perhaps not quite so hardy nor so strong a grower as the *conspicua*. In China, the *M. purpurea* is always found in company with the *conspicua*, and in that empire equally esteemed: it is one of their court-yard plants; and drawings of it may be found in every picture shop in Canton.

It is probable that the *purpurea* had been often sent to Kew before 1790, as well as to Mr. Slater, who usually divided what he received by his own ships, with his friend Sir Joseph Banks; but none of these succeeded till it was found in the collection of the late Duke of Portland in 1795, who had received it from China a year or two before. Mr. Rangecroft, his Grace's flower gardener, was advised to turn it out into a low glass-covered border in front of the stove, where it flowered, we think for the first time, in 1796. Mr. Slater, among several other Chinese plants which he introduced, is said to have introduced the *Rosa semperflorens*; but we have reason to believe that that was received through some other channel. The small red, scentless species, or variety, called by the Chinese, *Cha-kune*, was received by Mr.

Slater in 1790, and flowered, for the first time, in his collection in 1791; but the *R. semperflorens* was not then among his imported plants.

Had that enthusiastic lover of plants, and excellent gentleman, lived till 1794, he would have been in possession of many Chinese plants, which he had for several years before been at great expense to obtain; as in that year he had a large consignment brought home for him; but his death caused them to be distributed in other quarters, the chief of them to the collection at Kew, and of that then ardent collector, George Hibbert, Esq., of Clapham.

*The Botanical Register*.—The April number of this periodical exhibits some fine plants, viz. *Dracena terminalis*; *Berberis dealbata*; *Lælia anceps*; *Monachanthus viridi*; *Arbutus procera*; *Brassia lanceata*, a very curious orchideous plant; and *Rhodochiton volubile*, formerly *Lophospermum rhodochiton*.

*The Flower Garden*.—The April number contains figures of *Gladiolus natalensis* one of the most showy of the genus; *Dianthus Carthusianorum*; *Rhinopetalum Karelini*; *Rhododendron Indicum*, variety *speciosum*.

## MISCELLANEOUS INTELLIGENCE.

*To the Editor*.—If you have cultivated with success the *Oxalis crenata*, I should be obliged by your informing me how to manage it, as I have completely failed. In the latter end of February I planted a dozen tubers; they grew most luxuriantly, having shoots from four to five feet long; and if, as is said, these make as good tarts as rhubarb, I might have had abundance; but as my object in cultivating them was to obtain tubers (which are said to have a flavour between a potato and that of a sweet chestnut), I felt much disappointment on digging them up in November, that not a tuber had been formed. I may observe that the soil they grew in was very rich; and this, perhaps, may be the reason I had all top and no bottom growth.

Yours, truly, &c.

We quite agree with our correspondent that they were planted in too rich a soil; as they never fail to produce tubers on light sandy land.—*Ed.*

**METHOD OF GROWING AND MANAGING STRAWBERRIES, AS PRACTISED IN AMERICA.**—The plants are placed in rows on beds, as usual, but during the fruiting season the surface of the ground between the plants is covered with tanner's bark to the depth of three or four inches.



This coat of bark defends the roots from being hurt by the sun's heat, and prevents the runners striking into the soil; the bark also reflects the heat of the sun very powerfully upon the ripening fruit, and thereby expedites their swelling off. The bark should not be used for this purpose until it has been at least one winter out of the tan-pit, as recent bark contains too much astringency to be suitable.

In sending strawberry plants from this country to America, or any other similarly distant place, the best way is found to be—clear the roots from every particle of soil, cut off the leaves, and stow them in layers among moss almost dry, in a mat, or box, placed between decks on board ship.

M. SAUL.

MR. KING, the botanical auctioneer, announces for sale (at the Mart) a fine collection of standard roses, lately brought from France; among which there are a number of "*red flowering Laburnums*." The pale purple has been in the possession of Mr. Loudon for several years, but whether these advertised plants be the same does not appear. Mr. King adds, that they are the first which have been offered for sale in this country.

DEATH OF MR. DOUGLAS, ONE OF THE BOTANICAL COLLECTORS FOR THE HORTICULTURAL SOCIETY OF LONDON.—A report of this sad event was circulated in London about the 1st of March, and was soon afterwards confirmed by Captain M'Konnochie, who stated that poor Douglas met his death accidentally in one of the Sandwich Islands, where he was without a guide, in search of new plants.

It appears that these islanders dig deep pits and cover them with brush wood, for the purpose of entrapping wild bulls. Into one of these Mr. Douglas inadvertently fell, and where there had been one of these ferocious animals already caught. The consequence may be easily conceived; Mr. D., in this dreadful prison, and without either time or possibility of escape, was gored and trampled to death! Never since the fate of the elder Pliny has there been such a victim to the pursuit of natural history.

This was the second excursion Mr. D. was engaged in for the H. S., traversing the wild and inhospitable tracks of California, the rocky mountains and other countries but little known along the western shores of central America. The results of his first visit to those countries was a pretty numerous collection of herbs, shrubs, and trees now naturalised in Britain; and since his last departure from England a good many seeds, the first fruits of his second excursion, have been received by the society. But it is supposed that his acqui-

sitions during the two last years of his wanderings, must have been both extensive and valuable.

We know nothing of what bounds or countries Mr. D. had fixed on to explore ; but it seems he seized an opportunity of visiting some of the Sandwich Islands, in the Pacific Ocean, little expecting that from these he would never return. Every naturalist has cause to lament the death of Mr. D. ; for though his objects were chiefly botanical, yet it is quite reasonable to suppose that the kindred branches of natural history, viz. geology, zoology, and entomology were not neglected by him.

Whether his collections have been preserved, in what quantity, or of what description ; and whether his journals are safe, are matters which we are all anxious about, but of which nothing positive has transpired. We have only to hope that what he has left behind him will fall into such hands as are competent to give them publicity, for the good and gratification of the living, and to the honour of the lamented dead !

In the last number of the *Quarterly Journal of Agriculture* there appears an extract from the Journal of Mr. James Macnab, of the Royal Botanic Garden of Edinburgh, who, with Mr. R. Brown, formerly of Perth, undertook a journey in the summer of last year to North America, for the express purpose of witnessing the natural character of the different forest trees and shrubs which compose the sylvan scenery of Canada and part of the adjacent United States. To professional or practical botanists a view of plants in their native habitats is of the greatest service. No perfect idea can be formed of trees by those who have only seen them confined in pots, arranged in rows in our nurseries, or dotted here and there in our parks or pleasure-grounds. To gain the necessary knowledge of the effects of a natural forest, of the distribution of the trees on hill and dale, of their natural localities, grouping and various combinations, such things must be seen before they can be either described faithfully, or imitated correctly. No doubt the young tourists have imbibed a valuable stock of ideas which, if ever employed as planters in their native country, they will avail themselves of with credit and advantage.

Our travellers take no notice of the manners and customs of the inhabitants. Trees they journeyed to see, and of trees only do they speak. "Proceeding," say they, "up the St. Lawrence river and its connection with Lake Ontario, scarcely any of the original forests are to be seen. They have been cut down on account of their proximity to the waters, and the ready communication these afforded for floating down the timber to the shipping places. On the different islands

which we visited, the hemlock spruce was abundant, and of great size, as well as arborvitæ, walnuts, oaks, sugar maples, and elms.

"At the entrance of Lake Ontario fine old forests were seen in the neighbourhood of Kingston, particularly of the white or Weymouth pine, many of them exceeding one hundred feet in height, and ten or twelve feet in circumference at four feet from the ground. One noble specimen, which had been blown down, and the top broken off, the stem measured eighty-eight feet in length, and where it was broken it was eighteen inches in diameter.

"Crossing to the United States' side of Lake Ontario, the forest scenery presented much the same appearance as that of Lower Canada, with the exception of the arborvitæ, which becomes more prominent and acquires greater size, the stems averaging between two and three feet in diameter. Crossing again to Toronto (late York) on the Canada side, a very great difference in the vegetation from that seen in Lower Canada is observable; and, for the first time in Canada, healthy and luxuriant specimens of weeping-willows are seen, also fine specimens of the locust tree (*Robinia pseudo-acacia*), broad-leaved American beech, with Canadian and Lombardy poplars, limes, oaks, ashes, elms, white pine, and hemlock spruce. For the first time in the country we observed the *Pinus resinosa*, or red pine. This is not a plentiful tree, for it was not seen either before or after leaving this tract; the trees of it were tall, but with stems not exceeding two feet in diameter. The red birch in this neighbourhood was a fine shaped tree, about two feet in diameter, with a fine spreading top, having much the appearance of the beech trees of this country.....Here (that is, near Fort Niagara,) for the first time in Canada, peach orchards were seen to abound; trees healthy, though with small sized fruit. On the road side, before reaching the Falls, is a very extensive natural forest of sweet chestnuts: what is very remarkable, the trees stand at such regular distances that at first one would not hesitate to think that they had been planted by the hand of man. Not a great way from this we observed a similar forest of large native oaks, with precisely the same appearance of regularity; yet in both cases the arrangement was wholly the work of nature, the stronger individuals having probably smothered the weaker. .... After passing Brentford, in Upper Canada, we entered into the great natural forests of the country. Over miles of level ground, on either side, nothing was seen but oaks of great height; they were here crowded, and consequently none had attained a great diameter. When the ground became in the least elevated white pines abounded."

The above extracts show the complexion of the young travellers' journal; and we unite with the editor of the *Quarterly Journal of*

*Agriculture* in advising the publication of the whole of their interesting notes in a separate form. As the writers are both good practical botanists, they cannot fail to elicit some information either of the habits or culture of North American plants which may be generally useful.

**THE SWEET LEMON.**—It is said, that in the Azores, and particularly in the neighbourhood of St. Michael's, the sweet lemon is produced by grafting the sour lemon on the orange. If this be a fact, but of which we have strong doubts, it is the only instance known that the qualities of the fruit of the graft can be altered by those of the stock. That sweet lemons are grown in the Western Islands, as well as in Italy, and that they are much used in the former country, is true ; but we must venture to deny that they are originated by the above mentioned means.

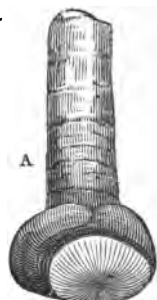
**PREMIUMS OFFERED BY THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.**—For planting not less than one hundred and fifty acres within a period of five years successfully.—For collecting the seeds of the *Pinus sylvestris* (Scotch fir) from native trees.—For raising larch from native seed.—For the introduction of new forest trees.—For the introduction of seeds of forest or ornamental trees likely to succeed in Scotland.—For the more extended introduction of known species of the fir tribe already in Britain. Under the last head attention is particularly directed to *Araucaria imbricata*, *Pinus ponderosa*, *Lambertiana*, and *Sabiniana* ; to *Abies Douglasii nobilis*, *grandis*, and *Menziesii* ; and to *Taxodium sempervirens*, which last is abundant in the vicinity of St. Francisco and throughout the low sandy plains of California. The Society also offers premiums for collecting the seeds of the following native leguminous plants, viz. *Vicia sepium*, *V. cracca*, *V. sylvatica*, *Lathyrus pratensis*, and *Lotus major* ; also for saving the seeds of Italian rye-grass.

The premiums vary from twenty-five to four sovereigns ; or medals, or pieces of plate of equal value.

November 6th, 1894.

**ON THE SELF-PRUNING OF TREES.**—According to promise, I herewith send you some specimens of self-pruning ; they are sprays from the black poplar. Mr. Ballard, who has written a treatise on self-pruning, says, "Trees have the power of pruning themselves ; all useless branches die and drop off." Now, with regard to the black poplar, *living* branches are detached annually, in October, in considerable quantities ; their attach-

ment to the tree is by an articulation, like those of leaves, fig. A. By this provision sprays are readily detached, and the tree relieved from its superfluous branches, enabling it the better to resist the winter blasts, while, during the summer, they were of service to the parent, by furnishing it with the organs of respiration. Did not this annual pruning take place, I am of opinion that the tree could not, for so many years, have stood, as it is sixty feet high, and its south-west side being close to a brook. I know of no other tree that detaches *living* branches, and I consider it a curious fact in vegetable physiology.—I remain, &c.



Bottom of a spray to show the articulation.

## METEOROLOGY.

### ON THE DEPOSITION OF DEW.

TO THE EDITOR OF THE HORTICULTURAL REGISTER.

SIR,—I shall now proceed to detail an experiment I have made, since I sent you my last paper, on the subject of the deposition of dew, and which, I am happy to say, affords convincing proof of the truth of the theory of Dr. Wells. But before I proceed, permit me to offer a few remarks on the erroneous views which appear to me to have led G. J. T. astray in the formation of his theory. I think the chief error into which he has fallen, in this as well as in other instances, is in attempting to account for phenomena which, in the present state of science, we must be content to consider as ultimate facts, or the analysis of which cannot be expected to be accomplished without a much more accurate acquaintance with the laws relating to them than G. J. T. seems to possess. Another source of error arises from the manner in which he has confounded the powers of radiation and conduction in the propagation of heat, having in some instances spoken of them as the same, though they are two distinct processes, each following laws peculiar to itself. I shall not now enter into a statement of these laws, as I propose at some future period to make them the subject of a separate article, but proceed to illustrate by experiment, the way in which these laws are applicable to Dr. Wells' theory of the deposition of dew. I procured two boxes about fourteen inches square, and without lids; one of tin, the other of wood, coated

with lamp-black. Directly over each of these, and supported by four sticks about two feet above the top of the box, I placed over the tin box a piece of tin, and over the wooden one a piece of wood, coated with lamp-black, so that a space should be left between the top of the box and the suspended covering, through which heat might unobstructedly radiate. On a clear evening I placed the boxes in the most open part of my garden, a few feet distant from each other, and suspended a piece of wool in each by a silken thread fastened to a stick, going across the top of the box, and so that the wool should hang in the centre of each box, and about three inches below the top: the weight of the wool was the same in both boxes, being exactly one hundred grains.

On examining the wool the next morning, I found that the weight of that which had hung in the tin box was increased to one hundred and forty-six grains, and felt quite wet, while that in the wooden box only weighed one hundred and twenty-one grains, and was scarcely damp. Now, to what can the deposition of moisture be attributed? Undoubtedly it is owing to the surface of the wool becoming colder than the surrounding air; but how, then, are we to account for this? It could not possibly be caused by any electro-conducting property of the wool, as it was perfectly insulated by the silken thread; and being itself a non-conductor, it could not have afforded a passage to an electric current; besides which, how could G. J. T. explain, by his theory, the difference in the quantities of moisture deposited in the two boxes? But, accounting for it on the principle of the radiation of heat, we have not only an explanation why the wool should become colder than the surrounding atmosphere, but also a sufficient reason for the difference in the quantity of moisture deposited; for, as the greater part of the heat radiated by the wool in the wooden box, was radiated back again by the surface of lamp-black, its temperature did not fall so low as that in the tin box, which was surrounded by a polished surface, capable of returning but a very small portion of the heat given off. I know not if the details I have given of the experiment are sufficiently clear to render it intelligible, but I hope, in a future Number, to enter more at large on the laws relating to heat, and particularly in their connection with horticulture.

J. B., JUN.

*Gosport, March 4th.*

## NOTICES OF NEW BOOKS ON BOTANY OR GARDENING.

**BOTANY.**—Publishing in parts, under the superintendence of the Society for the Diffusion of Useful Knowledge. By Dr. LINDLEY. Four of these parts are already published, and appear to be an abridgement of the author's larger works on the same subject. The treatise will comprise Structural, Physiological, Descriptive, and Systematic Botany, and will include the opinions of all the most eminent botanists on these different branches of the science, as embraced by the author himself.

**ARBORETUM BRITANNICUM.** By Mr. LOUDON. We have been favoured with the already-published numbers of this ingenious and interesting work. The fourth, or April number contains, besides twelve octavo plates, eight pages of letter-press, containing the history of the introduction of hardy trees and shrubs into Great Britain during the last century. This is an amusing part of the publication, and more especially as a few biographical sketches are added of the introducers. This feature of the work is also highly useful, as forming a condensed *chronicle* of the introduction of those plants which now form or diversify our woods and shrubberies, and which information is only to be gained by turning over a great many scarce books. To the possessors of trees and shrubs, this information is interesting, because, looking at their specimens at the present time, a good idea may be had of their fitness for the climate and situation, supposing them to have been procured a few years after their first introduction into the nurseries of the country.

**A TREATISE ON THE ACACIA** (*Robinia pseudo-acacia*), by W. WITHERS, Esq., of Holt, Norfolk; together with Observations on Planting and Pruning Forest-Trees, by Mr. John Sanders, is in preparation.

**A COMPLETE ACCOUNT OF THE HOP**, with an Essay on Blight in Corn, will shortly be published, by E. J. LANCE, of Lewisham, in Kent.

## CALENDARIAL MEMORANDA FOR MAY.

**KITCHEN GARDEN.**—*Peas and Common Beans.*—Sow once a fortnight for successive crops; also stick and earth up crops which require such treatment.

*Dwarf Kidney Beans.*—Moderate sowings of the Canterbury and dun-coloured varieties may now be sown on a south border of dry soil, in drills, two and a half feet apart.

*Carrots.*—Should be sown about the beginning, to draw when young during summer. The main crops will require thinning towards the end, and left at eight inches apart; a bed or two may be left thicker, to be drawn as wanted.

*Broccoli.*—Plant out the early raised plants two feet asunder, for heading in autumn; and sow the Siberian to produce heads late in the spring of next year. About the middle of the month sow the green and early purple Cape varieties, and Grainge's early white, to come in from the end of August to Christmas; at the end sow the green close-headed for winter use.

*Onions.*—Sow the silver-skinned to draw young in summer, and a bed or two very thick to produce bulbs for pickling. Thin and weed the first-sown crop.

*Califlowers.*—Those under hand-glasses may now be fully exposed; the earth drawn to form basins round the space occupied by the plants, and supplies of manured water frequently given to assist the growth. Towards the end sow another bed to raise plants for Michaelmas and winter supply.

*Savoy Cabbage.*—Plant out the earliest raised seedlings about two feet asunder, to head in autumn.

*Celery.*—The first-raised plants may now be transplanted into trenches for an early crop; a few trenches only will suffice at this time.

*Cabbage.*—Plant out the spring-raised seedlings for autumn consumption; and sow more seed of the early York and Battersea sorts. Hoe among, and draw earth to the stems of the earlier crops; and tie up the leaves of the forwardest with strings of mat to assist the heading.

*Radish.*—Continue to sow successive crops of the short top, and red and white turnip sorts at least once a fortnight; choose a cool and moist situation for these sowings.

*Endive.*—Sow a small bed of the green-curled sort towards the end of the month.

*Small Salad.*—Sow once a week on warm borders, in order to have a constant supply.



*Lettuce*.—Sow all the desired sorts twice or three times in the month, and continue to transplant from former seed-beds, placing them in rows ten inches apart, and on rich or well-manured ground.

*Turnips*.—Sow a rather large piece of the stone variety ; this sort is nearly equal to the early Dutch for sweetness, and is always of a moderate size and handsome shape.

*Spinach*.—To have a regular succession sow once a fortnight of the round-seeded sort.

*Runner Kidney Bean*.—Sow a full crop in this month. If any have been raised in boxes in the house they may now be planted out in single rows, where there is plenty of room. If double rows are sown or planted they should not be nearer than four feet from each other.

*Beet*.—The red will now require thinning, so as to stand at ten-inch distances ; the green and white may be allowed six-inch distances between plant and plant.

*Potatoes*.—May still be planted, but the sooner in the month this business is done the better chance there will be of a mature crop of tubers.

*Vegetable Marrow and Gourds*.—Preparation must be made about the middle of the month for the culture of these plants. These are treated in the same way as ridged cucumbers ; and the plants being previously raised and potted off in hotbeds, may be put out under hand-glasses at the same time, say about the 20th day of the month. Seeds of vegetable marrow and cucumbers may also be sown on warm borders about the end of the month, and will succeed pretty well unless the summer is very cold and wet indeed ; but they are the better for being started on a little dung heat. This is done either by making trenches or square pits two feet wide, and as much in depth, filling the same with well-prepared stable dung, and immediately covering this with about eight inches of dry rich compost. Soon as the heat has risen and warmed the covering of compost, place the hand-glasses three feet apart along the middle of the trench or rank of pits, and under each a pot containing three cucumber plants are carefully placed a little deeper in the compost than the depth of the pot. Thus planted, watered, and the glasses put on, they are covered on nights, and shaded by day with mats till they have taken fresh root ; after which they only require a little fresh air every day by raising the south front of the glasses on a brick-bat, and shut down at night.

*Herbs*.—Different kinds should now be propagated by slips.

#### MANAGEMENT OF WALL AND FORCED FRUITS DURING MAY.

*Apricot Trees*.—These trees will require to be narrowly looked over in this month ; misplaced shoots should be rubbed off before gaining strength to exhaust the juices of the tree, and all distorted leaves, the

work either of insects or parasite plants, should be picked off and destroyed. If the trees have had any kind of protection it may be removed, but not before the middle of the month.

*Peach and Nectarine Trees.*—Require to be looked over in this month to regulate the growth. This business is usually performed in June, or even later, but as the symmetry and perfect health of the tree depends entirely on the summer regulation, it cannot be done too soon. Far better it is to displace a bud than allow it to grow two or three inches in length and then to break it off; the first induces a moderate movement in the system favourable to fruitfulness; the second causes an unnecessary excitement which can only be by repeated mutilations checked. This care should be bestowed on all wall trees and espaliers, which being confined to a limited space and in a position so unlike their natural forms, require to have their natural energies (prompted, perhaps, by a rich soil and fine situation,) kept in subjection, by discouraging the production of superfluous shoots, or flowers, or fruits.

*Peachery.*—The fruit here, if fire was put to in December, will now be swelling off. A higher temperature is now necessary, say from seventy to seventy-five degrees of Fahrenheit's scale by day, and from sixty-five to seventy during night. Guard against the attack of the red acarus.

*Vinery.*—Training reserved shoots and divesting them of tendrils, of lateral shoots above the first joint, stopping redundant growths, thinning the bunches and tying up the shoulders of the largest, giving seventy degrees of heat, but at the same time plenty of air, and keeping free from insects, is the usual attention bestowed at this time. Vines in pots may be brought into the house; the fruit will be ripe about the first of August.

*Cherry House.*—About this period the fruit will probably be stoning. This is a critical time, and much care is required to keep an equable degree of moist temperature. This should never exceed sixty degrees by day, and fifty-five on nights. When the fruit begin to swell off the heat may be gradually increased to seventy by day, and allowed to sink to sixty-five at night. Give plenty of fresh air, and keep the trees and air of the house moist by frequent syringing till the fruit are nearly ripe, when this must be discontinued.

*Pinery.*—The grapes in this house being forward will require thinning, and the trees to be relieved from all irregular or unnecessary growth. The pines of every degree must have the due share of heat both at bottom and top; fresh air and water whenever necessary.

*Melons and Cucumbers.*—The frames of these fruits, particularly the former, will now require particular attention in regulating the number of fruit, and giving assistance to those which have begun to

swell off. Sufficient bottom heat and due supplies of water must be afforded, as well as sufficient night coverings, even at this advanced period of the season.

*Strawberries*.—In pots should be forced in regular succession either in houses or in frames ; and the crops in the open garden, if the weather be dry, should receive copious waterings at this time to ensure a full crop.

#### BUSINESS OF FLOWER GARDEN IN MAY.

Sow a succession of hardy annuals and biennials ; and thin and transplant some of those sown in March. See that all the tender annuals in frames are duly potted. Such as are intended to be placed in the open borders may be put out about the end of the month.

*Auriculas*.—Must be carefully guarded against slugs and caterpillars at this time ; and when they are done flowering they may be shifted. Those plants intended to ripen seed should not be shifted at this time, but set under a south wall, and be well supplied with water till the seed is ripe.

*Cereus* and other allied succulent plants are watered sparingly, and treated as hereinbefore recommended.

*Camellias* being now in a growing state will require a temperature of from sixty-five to seventy by day, and from fifty-five to sixty on nights. If about the end of the month the young shoots are perfected, increase the heat to eighty or eighty-five degrees by day, and seventy to seventy-five by night, to assist the development of flower-buds.

*Carnation*.—Seed may be shaken out of the capsule and sown about the middle of the month in pans or pots of light soil, and very slightly covered with earth.

*Chrysanthemum Indicum*.—Separate the best suckers from the old stools in this month, and pot them in sixty-sized pots for flowering plants next season.

*Dahlias*.—Plant out seedlings, and turn out such as have been forwarded in frames or houses about the end of the month, into the borders or places where it is intended they shall flower.

*Ranunculus*.—If the roots of these plants be planted now, instead of earlier in the season, they will yield their flowers in August.

*Violets*.—New beds or patches may now be made ; runners from the old stools make the best new plants.

*Rose Trees*.—The common roses which were left unpruned at the usual pruning season, may now be cut back, in order to obtain a late show of flowers. This practice may be continued for a month or two later in the summer.

Cuttings of heaths, passion-flowers, and many other ornamental plants may now be put in with every chance of success.

## REMARKS ON THE WEATHER.

IN the latter part of the month of March, and the beginning of April, we had fine, moderate weather, without frost to hurt, or bright sunshine to excite the flower-buds too much. All fruit-trees, at that time, had a most promising appearance, being covered with a profusion of flower-buds. The scanty crops of pears and plums last year, prepared the trees for a full crop in this; and certainly, about the time we are referring to, the prospect was favourable.

About the 11th of the last-named month, the atmosphere became more clear, with slight white frosts on nights. Pears and plums were partly in bloom, and, of course, in some danger; but as the air and trees were quite dry, not much damage was at that time sustained.

The brimstone butterfly appeared on the 7th, and for a week afterwards the weather was rather warm, with very slight showers occasionally. On the 15th the sky became cloudy, with high wind and rain, but clear at night, followed by frost next morning. On the afternoon of the 16th came on a storm of snow, which, though it melted as fast as it fell, left the trees and flowers completely drenched with moisture, in which state they were assailed by the sharpest frost we have had this year. All the flowers that were fully blown, it is likely, were destroyed that night; but as they were not a fiftieth part of what were on the trees, it is to be hoped that enough are yet safe. On the morning of the 17th there was again a sharp frost, which, no doubt, added to the damage of the night before.

Since that time the weather has been variable, with now and then a kindly shower, without frost, or long-continued sunshine, and, up to the 24th, rather favourable for the flowers of all the fruit-trees now in bloom, including cherries and apples, both of which are now coming rapidly into flower.

The redstart and smallest willow wren had arrived on the 18th, and about the same day the nightingale was heard. Neither swallows nor house-martins have yet made their appearance about London,

The frost of the 17th is said to have been much more severely felt on the south, than on the north side of the river Thames; but this can be only very partially the case.

*London, 25th April, 1835.*

# PAXTON'S HORTICULTURAL REGISTER,

JUNE, 1835.

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## HORTICULTURE.

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### ON THE EFFECTS OF SITUATION AND EXPOSURE ON DIFFERENT KINDS OF PLANTS.

BY THE EDITOR.

As by far the greater number of plants cultivated in this country are exotics, we find they are variously affected by the changeable weather of our climate, as well as by the attending circumstances of the situations they are destined to occupy. Our knowledge, acquired by experience, of the constitution of foreign plants, has supplied us with rules for our guidance in the distribution of them. If we happen to be acquainted with the native habitat of a plant, we can judge pretty accurately what place it is most likely to thrive in with us. Tropical plants, for instance, we place in the stove, or conservatory; Australian, South African, Chinese, and South European, in the greenhouse; and those from the northern parts of Asia, Europe and America, any where in the open air where we may have occasion for them, or which we may think best adapted for them. This is a very natural way of proceeding; but we are not always right in its application; some tropical plants are killed by placing and keeping them in the stove; because it is not so much the latitude whence they have been brought, as it is the elevation of their habitat above the level of the sea which determines their hardiness. Many plants are debilitated by confinement in the green-house, and very many extra-tropical plants are lost from being placed in what is considered the warmest or most sheltered situation.

These errors are occasioned either by a want of experience respecting the constitution of the plant, or from inattention to the extreme change of temperature to which it is exposed in its new place, or from ignorance that situation and exposure change the constitution of plants to such a degree that, while one is perfectly hardy if nursed on a northern aspect, another of the same kind shall be so tender and vulnerable on a southern exposure, that it dies, or is cut down to the ground, under the slightest frost.

Want of experience concerning the constitution of a newly imported plant may be said to be an excusable want of judgment; because we have no means of knowing without experience, there being no general rule to guide. If, indeed, we are told that it is an annual from a warm country, we may safely conclude that it will succeed in this climate during summer, as many tropical annuals do. Or, if it be a perennial herb from the same country, we may find it answer with us if it be only protected from frost. But if tropical shrubs or trees are brought to us, we cannot, from any external mark, judge whether they are liable to be killed by frost or not. If they shed their leaves in winter, it is only a sign that they are winter-resting plants, not that they are hardy; because there are several tropical plants which are deciduous, as for instance, the silk cotton tree (*Bombax ceiba*); and many evergreens are as hardy as those that shed their leaves.

We often fail in preserving tender plants from inattention to local circumstances. We are liable to mistake shelter for warmth. Frost and the north and east winds are most dreaded in this country. A southern exposure, whether for the abode of animals, or a station for vegetables, is always considered the most eligible, merely, perhaps, because it is the most agreeable to our own perceptions. But in respect of vegetables we often err in this matter, both in choosing sheltered situations and southern exposures.

Cold (or rather cold air) is always most intense in humid situations, because there is the most copious evaporation. Such situations, in this country, are either on the tops of clayey hills, or in the lowest valleys, where there is either a lake, river, or brook. These low grounds are nearer the main springs, and often abound with them, whence exhalations are ever rising, though imperceptible; of course such a valley must always be more chilly, and more subject to keen frost than any drier or more elevated situation. Such gleams, provided they are open to the south, are chosen as the most suitable for tender exotics, merely because they are more sheltered from the northern blast. In the summer, indeed, such a locality is most favourable to the quick and strong growth of every plant. The air, being generally calm and

moist, conduces to vigorous expansion; and the very coolness of a summer day or night, as felt in such places, is most propitious to luxuriant vegetation. These circumstances, however, instead of being beneficial to tender exotics, have a directly contrary effect; the summer excitement only renders them less able to bear the frosts, which fall upon them with redoubled intensity in winter. And instead of the slow and sturdy growth which would have happened to a plant on a dry and breezy hill, or on a northern aspect, we have an enfeebled nursling, unfit to bear the rigours of our climate from sheer mismanagement.

Many proofs of the truth of these statements may be adduced, but we presume they are unnecessary, as the facts must have been repeatedly observed by our readers in general. The fact, however, is most important, not altogether for the sake of naturalising exotic plants, but for fixing on the sites for gardens and orchards, which, if misplaced at first, give cause ever after for regret.

Not only do the exhalations from a moist valley generate cold, but the cold air which descends upon the hills after sunset is said to "slide down" and settle in the lowest place. So firmly is this believed, and acted on by a well-known horticultural philosopher, John Williams, Esq., of Pitmaston, near Worcester, that in all cases where a garden is made on ground sloping to the south, that gentleman invariably advises the lowest boundary to be a hedge; or if a wall, it be raised on grated arches high enough to allow the escape of the cold fleece of air accumulated within the garden. On the same principle, whatever may be the aspect, the upper boundary wall should be high and close, to intercept the descending current and divert it round the ends.

From these circumstances, then, it is fair to conclude that low situations should never be chosen for garden sites, or as the best places for tender exotics.

There is another circumstance not yet adverted to, which operates injuriously on tender plants in sunny and sheltered valleys. There, they are sooner affected by the returning warmth and solar beams of spring, and hurried into a premature growth long before frosts are over, or the summer temperature confirmed. They are awake and putting forth their tender leaves and shoots before the exposed residents of the hill are in the least acted on. The first have their sap liquefied and in motion; that of the second is clammy and at rest: the first suffer because they have to sustain *four* degrees of frost perhaps, when least prepared for it, while the second have only to bear *two* degrees, and are otherwise fortified against it.

The native plants of the frosty regions of Siberia suffer greatly from late frosts when introduced into British gardens, not from the severity

of our seasons compared with that of their own, but entirely from the changeableness of the former. In Siberia the winter sets in at once, and the surface of the ground is soon covered with snow; every vegetable becomes instantly torpid, and in this state remains in perfect safety till the return of spring, or rather summer, as there is scarcely any spring season in that northern clime,—no intermission of mildness to excite, and frosts to destroy the tender plants, as is so often experienced in this country. Mr. Anderson, the curator of the Chelsea Botanic Garden, has, in his collection of the genus *Iris*, several from Siberia, which require particular management to see them in beauty. Soon as a bright day in February warms the ground, forth come these humble gems of the north; and which, without some protection, would be withered by the first frosty night, or first frosty wind that blows.

The changeableness of our spring weather is, in fact, the greatest bar to our possessing very many plants, which, to have at all, must be guarded in some kind of building erected for the purpose. Our want of success in attempting to naturalise some exotic shrubs and trees, however, may have happened not so much from the constitutional delicacy of the plants themselves, as to the injudicious manner, perhaps, in which the trial has been made. Exposed situations on the north side of a hill, and on poor and dry, rather than on rich and moist soil, is certainly the most eligible station for making a trial of the constitution of a foreign plant. Here it would not be excited into too early growth by the early sun of the day or of the season, nor would the aspect induce precocious growth. Its growth would be slower, but its shoots would be firmer in texture, and consequently better able to resist the destructive effects of frozen sap.

We cannot conclude these observations without first alluding to the ideas entertained about the *acclimation* of exotic plants. The notion is founded on the supposition that, as animals have a tendency to accommodate themselves to foreign climates, or to the changes of temperature of their own native place, so plants may in like manner be susceptible of physical changes which would enable them to bear great diversity of climatal temperature; but from all experience on this point it appears, from many tropical annuals long cultivated in Britain, that they have not perceptibly advanced in hardihood since the first day of their introduction. Such are the runner kidney-bean (which by the bye is a perennial); the potato and cucumber among culinary vegetables; the China aster and balsam among flowers; and the melon among fruits. All these have been perpetuated by seeds produced in this country ever since their first introduction; but without gaining any additional protective habit against frost. We may, there-



fore, conclude that plants generally have been formed for the climates to which they are indigenous, and have not that mutability of structure or of sap which would render them invulnerable to frost in a colder country, or to the incessant excitement of a warmer one without deterioration.

That many plants are now seen in the open air which were formerly in the green-house or even in the stove is well known ; but this has not happened in consequence of any change in the constitution of those plants ; but merely from being misplaced on their first introduction for want of experience :—the *Aucuba Japonica*, one of our hardiest shrubs, was once under our care in the warmest end of a conservatory !

The effect of frost on tender vegetable bodies is mitigated by thawing it off with water before the sun shines upon them. This seems to contradict what has been before stated, as to dryness being a safeguard to plants. But the cases are different ; perfect dryness is a security against frost, but when plants are loaded with frozen dew, and this allowed to be dissolved by the sun, a much more intense degree of cold is generated during the solution of the icy particles by the sun, than if they were suddenly dissolved by water. It is this increased degree of cold which ruptures the delicate vessels of the plants, and of course destroys them.

Sometimes we see the stem of a slender shrub, as a heath, for instance, rent into many pieces, while the youngest shoots remain unhurt. This is owing to the rigidity of the first, and the elastic texture of the second ; the latter yields to the distending effects of the congealed sap, and afterwards returns to a healthy state ; but the unyielding character of the old wood only renders it the more destructible. The foliage of the grasses indigenous to cold countries is only withered by frost, but seldom destroyed, owing to the tenacity and elasticity of its structure.

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#### ON THE CULTURE OF OXALIS CRENATA.

BY MR. PETER JENKINS.

SIR,—As the culture of the *Oxalis Crenata* appears still to interest some of the readers of the *Horticultural Register*, I have, at the risk of being considered officious, taken the liberty of addressing a few lines on the subject ; not that I think any national advantage will ever arise from its culture, but wholly to show how tubers may be procured by those who are anxious to obtain them.

Therefore suffice it to say, that in the autumn of 1833 I received two plants of the *Oxalis* from the nursery of Messrs. Malcolm & Co., at Kensington. The plants were in thirty-two sized pots, and in very good health. Being desirous to see what kind of produce I was likely to have, I immediately turned one of the plants out of its pot, and began a minute search for the tubers, but to my great surprise not one could I find; the other plant was examined with the same result. In this state of things I was posed as to what course to pursue, but, after consulting a friend on the subject, I re-potted the plants in leaf-mould and sand, and placed them in a cucumber frame, where they grew with extraordinary vigour; I also at the same time took off two cuttings from each plant, and planted them in the same soil, and placed them in the frame. They struck root in about fourteen days; and, to my infinite satisfaction, when I potted them off I found they had formed tubers at each of the joints under the soil; I therefore determined to encourage the plants so as to procure as many cuttings as possible, and by the end of November I had upwards of a pint of tubers, some of them as large as pigeons' eggs. I kept the tubers in a dry, cool shed, in dry sand, through the winter.

In the following spring, about the middle of March, I examined my tubers and potted them in forty-eight sized pots, in loam and leaf-mould, putting one tuber in each pot; the pots were placed in the pine stove until the plants were about two inches high, when they were removed to a cold frame, where they grew very strong, and were gradually removed to the open air. About the middle of May a piece of light, sandy ground was digged for them, and the plants were turned out of their pots, and planted in rows two feet apart, and the plants eighteen inches apart in the row. They grew very strong through the summer, the quantity of herbage made was prodigious, and I very confidently calculated upon a large produce; but to my great surprise, on taking them up after the October frosts had destroyed the tops, not the smallest granulous root or tuber could be found. You will therefore see that they do not always "produce tubers on light, sandy land."

So far is the result of my experience in the culture of this much belauded rival of our wholesome potato; and as I have tasted the tubers, and as it is found by chemical analysis that a certain weight of the *oxalis* does not contain so much farinaceous matter as an equal quantity of potatoes, it follows, as a matter of course, that it never can supersede the common potato for edible purposes. Hence I can only say to those who are desirous to prove the *oxalis*—take cuttings next autumn, from six inches to a foot long, and plant them in a light, sandy soil, in a frame; keep as many joints under the soil as possible, and

you will obtain plenty of tubers. For my part I have quite relinquished the idea of cultivating it any more.

Should my communication be considered worthy of notice, I may, perhaps, ere long, trouble you again. And remain,

Yours respectfully,

PETER JENKINS.

Devonshire Road, Chiswick,  
May 2nd, 1835.

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#### REMARKS ON THE DIFFERENT MEANS EMPLOYED FOR HEATING HORTICULTURAL BUILDINGS BY STEAM, AND HOT WATER.

IN our last number an extract, with illustrations, was given, of the late Mr. Tredgold's paper on heating buildings by hot water, read at a meeting of the Horticultural Society of London. In that paper it is truly said, that, notwithstanding the advances already made in the management and application of heat to horticultural and other purposes, it is "*difficult even to imagine the extent to which this power can be applied.*" This idea and assertion of the lamented Tredgold was not lost on those of his own line of business when apprised that such was his opinion; and, consequently, rapid strides have been made in improving the apparatus in use for conveying heat by the medium of water.

The principle was clearly laid down by Mr. Tredgold; namely, that a boiler fitted with pipe of any moderate size and length, one end of which should be inserted near the top, and the other turned round and inserted near the bottom of the boiler, a current of the water with which the apparatus is first filled would be generated from the top round to the bottom of the boiler, as soon and as long as fire was kept burning under it. The cause is this: all fluids are heavier or lighter according to their temperature; heat rarefies water, and this being expanded, rises to the top of the boiler and flows along the upper pipe, and, in the mean time, the colder and heavier water in the lower pipe finding a kind of vacuum in the bottom of the boiler, rushes in to maintain an equilibrium. Thus a constant circulation is continued so long as any one drop of it is warmer than another. As the hot water circulates, it gives out its heat through the sides of the pipe, and always in proportion to the heat of the water, or to the extent of the *radiating surface* of the conveying pipe.

On this principle all the various methods invented by different

engineers are founded ; and they are more or less efficient according to the degree of heat required, to the quantity of fuel applied, or to the celerity by which the body of water is heated on applying fire.

In all cold climates heat may truly be said to be a necessary of life ; and the easiest, safest, and least expensive way of having a command of this, whether for personal comfort, for domestic or manufacturing purposes, or for preserving exotic plants and maturing their fruits, must be the most desirable. Stoves and smoke flues, however efficient they may be for many purposes of house and garden management, are always attended by a disagreeable, sulphurous smell, highly offensive in buildings erected for the preservation of sweet fruits and flowers. Then there are accumulations of soot,—flaws, which allow the escape of smoke, and always the risk, or at least the fear, of the flue bursting, or of the soot taking fire. Besides, smoke-flues require a large furnace, and much care is required in making up the fire for the night, lest it should burn too fiercely, or not at all.

These being the defects of fire-flues, it is not at all to be wondered at that some other mode of imparting heat should be invented. The steam-engine had already been brought to great perfection as a motive power ; and the high degree of heat evolved from steam, which at the same time was an elastic and transfusable fluid, readily suggested the idea of using steam in pipes, instead of smoke in brick flues.

Before this time gardeners had observed, that plants forced in any way were greatly benefitted by being frequently steamed, and this was obtained by the simple process of pouring water on the hot flues. Hence arose a desire to have an apparatus attached to the furnace of the hot-house, and which might be used to supply hot steam whenever the manager thought it necessary. The scheme was first suggested, or at least first executed, by Gilbert Slater, Esq., of Low Layton, in Essex, (1791) who employed Mr. Slark, Ironmonger, of Cheapside, London, to erect a small boiler over the furnace of a small peach house. From the top of the boiler a tin pipe, about five inches diameter, was carried along close to the bottom of the back wall ; and in this, at different distances, were inserted branch pipes of smaller bore, and of different lengths, to equalize the distribution of the steam within the house.

Although this apparatus answered the purpose for which it was erected, by keeping the trees perfectly healthy and free from insects, yet it must be evident to every engineer that such an apparatus must act imperfectly, owing to the thinness of the conveying pipes, through which the colder atmosphere of the house condensed the steam almost as fast as it entered them. But when the air of the house and the pipes themselves became sufficiently heated, the delivery of steam of

course was plentiful. But the best result which, perhaps, originated from this, or some similar trial to introduce steam *without heat*, was the idea of employing these two fluids *in combination*. Hence has arisen the steam forcing system, so efficiently introduced at Sion Gardens, and elsewhere, by the late Mr. Tredgold himself.

From steam to hot water was an easy transition; for though the rarer fluid evolved more heat, the heavier was more manageable, because less ingenuity and niceness were required in the fabrication of the apparatus. Several engineers came forward with specific plans, some of which have been secured by patents. Some are on the first and simple plan of Atkinson, viz., with a boiler at one end of the house, and a cistern of equal capacity at the other, connected by upper and lower pipes, as has already been described. Some have open boilers with pipes acting on the syphon principle, whereby atmospheric pressure, it is supposed, is added to the weight of the colder water in the pipes to accelerate the circulation. Some have close boilers of various shapes, with connecting pipes or tubes variously disposed, and of different forms; some of the latter are circular, others square, and some are spread out like a table, two feet wide, with raised edges, and moveable covers to prevent, or allow, the escape of steam. These last are particularly convenient for the purposes of nurserymen in forwarding seedlings or cuttings along the fronts of their houses, especially if the metal covers have a coat of soft moss laid over, on which the pots are placed. Some engineers, in order to obtain a larger radiating surface, divide the large tubes into three or four smaller ones, uniting them in pannels through which the hot water traverses backward and forward in its way back to the boiler.

Of late there have been considerable improvements, or alterations, made in the construction of the boilers. The larger the body of water to be heated is, the longer time it requires to be put in motion; but when once thoroughly heated, the longer it will continue in motion and give out heat. On the other hand, if the boiler be small, and have a large surface exposed to the action of the fuel, the water is quickly heated, and the circulation almost instantaneous. If a small boiler has also a small system of tubes, the effect will be sudden, but transitory; but if a large and complicated system of tubes be attached to a small boiler, the circulation will be at first rather languid; and yet when the whole is fairly heated and in motion, the large system of tubes will continue to evolve heat long after the fire is extinguished. It appears, therefore, that a small boiler, with a complicated range of tubes, is more economical than a large boiler with only a leading and returning pipe.

These circumstances having been proved by experience, engineers have employed themselves in contriving the best form and size of boilers, and the means by which the burning fuel shall have the most direct action on them. One eminent engineer has invented a most simple apparatus, to which no boiler at all is used, a coil only of an endless pipe being placed in the fire. The pipe used is small—is air and water-tight, with an expansion tube attached. The action of this apparatus is impetuous, and, for the diffusion of heat, most surprising. The coil of pipe in the fire is sometimes red-hot, so that the water is circulated with wonderful rapidity. This invention is secured by a patent, and has been erected in many places with great success, when worked with care and moderation. Boilers formed of pipes are also coming into use, which are very quick in action, and may be worked at a small expense for fuel. In short, such is the variety of forms and powers of hot water machinery, that almost any degree of heat may be obtained for any purpose, and in any place. All the expedients for preserving or forcing early fruits or flowers in gardens may be certainly accomplished by the aid of a hot water apparatus properly constructed, and erected in fit and proper buildings, from the raising of small salad in the winter months, up to the growth and maturation of the largest pine-apple.

It is most material, however, that the machinery be adapted to the purpose for which it is wanted. For the service of a common greenhouse, peach-house, or vinery, an apparatus of the simplest construction and most substantial material should be chosen. Here instantaneous action, or very high temperature, or many dips or turnings of the pipes are not at all wanted; but merely a steady heat uniformly evolved, and capable of being raised twelve or fifteen degrees when necessary. But when it is intended that the same fire shall heat several houses—when there is much branching of the pipes, with stop-cocks for turning the current off, or for allowing it to pass onward,—then, indeed, the whole apparatus must be more complex; and the boiler, whatever its form, must be of corresponding dimensions and capacity.

For the purpose of hotbed forcing, for pits and hot-houses—in all which some fermenting substances are used, and for which the heat of steam or hot water is intended to be substituted,—the principle before alluded to is equally applicable; but the place of the boiler, the position and evolutions of the pipes under the bed on which the plants are to grow or be placed, must all be well considered and planned; the accumulated body of heat must be thrown into a chamber below the plants, and which is either left vacant or filled with round pebbles, or other substances which shall be receptive and retentive of the heat discharged from the pipes, and readily admit its ascent through the body of mate-

rials which support and compose the bed in which the roots of the plants are placed.

Such an apparatus can only be necessary and economical where much frame and pit forcing is carried on. One boiler of sufficient power in the centre of the range, with leading branches right and left, fitted with cocks and subdivision branches for the various products required, might be easily arranged by a clever garden architect, by which a world of expense and labour would be saved.

Whether such a scheme has yet been perfectly executed, we are not aware \* ; but of its practicability we have not the slightest doubt ; and we therefore particularly beg of our readers—gardeners as well as architects—to turn their thoughts to the subject: it is a branch of garden architecture which invites attention, and no doubt the ingenious Tredgold had such things in view when he penned the sentence which we have quoted at the beginning of this paper.

The object of the gardener, the space required, the quantum of heat and moisture, the thickness of the plant-bed, and the means of covering, when necessary, and for admitting fresh air, should all be first given ; and then the bricklayer's and carpenter's work, with the necessary enginery, would be arranged by the architect in such a manner as would at all times render the fabric and machinery entirely under the command of the manager.

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#### ON THE CULTIVATION OF WATER CRESSES.

BY Z.Y.

THE sanatory virtues ascribed to this vegetable have long made it valued as a salad plant. Being found wild in every streamlet in what is often called the old world, the necessity of cultivating it in England did not occur to any one, until a person residing near Rickmersworth, in Buckinghamshire (and who used to employ poor people to pick these cresses from the river Colne), could not at last supply the demand for the London market, more especially as he had no more right to the cresses in the river than any one else in the neighbourhood. But the idea of their cultivation occurring to him, and having the offer of the tenancy of a large branch of the river which bounded his own

\* Mr. Stothert's "*Description of various Modes of heating by Steam for horticultural Purposes*," extracted from the Transactions of the Horticultural Society of London in our preceding March number, relates only to the employment of steam ; but it is probable that, when the scheme has been more considered, a better and more simple plan may be contrived.

vegetable garden, he eagerly embraced the offer, and in a most spirited manner commenced the culture of the plant, on what he could call his own premises, and with the most successful and profitable result.

The great success attending this new branch of vegetable culture attracted the notice of the Horticultural Society of London, and on application, he supplied the society with a detailed account of his proceedings and success; and for which the members of the society voted him a medal, or some other valuable mark of their approbation. since that time numerous other cress plantations have been made in different parts of the kingdom, and it really appears that the demand about London is fully equal to the supply, thousands getting their bread by hawking cresses about the streets; and from the quantities daily disposed of, a stranger to London might naturally suppose water cresses to be, in that city, a necessary of life.

The place chosen by the first cultivator was a very shallow and wide branch, or rather a tributary from springs to the river, where the water ran rapidly over a clean pebbly bed, and in depth from one to two or three inches. It is necessary that the pebbly bed have a uniform and regularly graduated fall, as this is conducive to the growth, cleanliness, and facility of picking the cresses. In planting, for the first time, such a part of a stream, plants are brought from where they grow naturally, with a little of the mud adhering to them, and beginning at the bottom of the pebbly bed, arranging the plants one above another in longitudinal stripes, or narrow beds, with open spaces of a foot wide between, to allow a free passage to the water, and paths for the pickers to tread in. Thus placed the plants soon take root in the gravel, and are in no risk of being floated away.

If the plantation be subject to be deeply flooded by sudden thaws of snow in winter, or heavy rains at other seasons, the owner should have some contrivance like a dam or barrier at the top to turn the flood aside.

Any quick-flowing rivulet is suitable for growing water cresses; but spring water fresh from the fountain-head is by far the best, not only from the heat of spring water inducing more rapid growth, but because the growth is continued throughout the winter, and is therefore more profitable in that season when the produce is most valued. The success of the first cultivator depended very much on his supplies of spring water issuing from under the chalk formation in that neighbourhood. But his industry and skill contributed greatly to to make the business a profitable speculation.

A plant of this kind is cultivated in India in rather an expensive manner. It is called water cress by the English residents, but whether



it be the *Nasturtium officinale*, English water-cress, the writer is uncertain, as the plants were only very small seedlings when seen. The plants are cultivated in the following manner:—a trench of any length and about four feet wide is made in the ground about two feet deep. Into this water and the finest of the earth is thrown and mixed together forming thin puddle, till it is nearly as high as the edges of the trench. Over the whole length and width of the trench a shed or hovel is raised, and thickly thatched with cocoa-tree leaves, but open on the side and ends. The hovel finished, young plants are stuck in pretty thickly all over the surface of the puddle, and as much water let on as just allows the leaves to float. As this is quickly exhaled away, more is from time to time added to keep the surface always moist. In this shaded situation the plants grow quickly, and soon come into use as a most acceptable salad herb in that warm climate. It is only gentlemen of fortune, however, who can treat themselves with such a luxury.

The anti-scorbutic powers of the water-cress constitute its principal value as a condiment to food, and as the plant grows plentifully in a deep dell under a natural cascade in the Island of St. Helena, the crews of ships touching at that island are sent on shore, for the purpose of having a feast of this pleasant medicinal plant.

It but seldom happens that it is necessary to cultivate water cresses for private use; because wherever there is a stream of water, there the plant is spontaneously found, and where there is no stream they cannot be introduced. Stagnant pools are unsuitable, for though the plant will grow, they are neither so clean nor so palatable. For the supply of cities, or large towns, however, wherever a branch of a river can be appropriated to the purpose, or even where a constantly wet part of a meadow could be formed into a shallow channel for the growth of water cresses, the space so occupied would be, without doubt, as profitable as any other portion of the land.

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#### ON THE PRACTICABILITY OF IMPROVING CULINARY VEGETABLES.

THAT the bulk, form, colour, and qualities of the greater part of our kitchen garden vegetables have been progressively advanced, from a diminutive and almost worthless wild state, to what we now find them, is sufficiently manifest. The wild cabbage, carrot, parsnep, and potato are all plants of little or no value; but since their domestication, by continued cultivation, and the application of practical skill acquired by

experience, each of these plants have become of the greatest importance, as forming a considerable portion of the food of man. We have no early records to inform us by what gradual steps these valuable changes took place ; but we can judge, and with much certainty too, that such improvements happened in former times, as they do now : a new variety makes its appearance unexpectedly and accidentally ; the experienced eye marks the stranger ; it is guarded and cherished, and its seeds or roots are saved, re-sown or re-planted, and henceforth takes an upper place among its congeners, and is regarded accordingly.

In tropical countries, where interminable woods and jungle prevail, fruits of various kinds supply the indolent natives with the principal part of their food ; animal diet is but little used or cared for ; but in higher latitudes this is the chief, but always eked out by the wholesome grain, herb, or nutritious root ; the latter often partaken of alone, and used as a substitute for bread. The hardness of most of our tuberous and other culinary vegetables has made them particularly suitable for northern climates, as in no part of the world can they be grown in such perfection (except onions, perhaps) as between the forty-eighth and fifty-eighth degrees of north latitude ; nor has any other country, not excepting even Italy itself, produced greater variety of kitchen vegetables than have been brought into cultivation in the north of Europe.

That most of our new and superior varieties have originated accidentally is a well-known fact, because it is only of late years that the doctrine of hybridisation of plants has been so well understood, practically proved, and explained. This doctrine is now very generally known ; already has it been of the greatest service to florists and orchardists ; and even farmers are partaking of the benefits to be derived from cross-impregnation, by gaining superior sorts of corn, and forage-plants for cattle \*. Hence it naturally occurs to every one who considers what has already resulted from chance in our present improved stock of culinary vegetables, why many of them may not be *still further improved* by manual assistance.

This subject was, some years ago, strongly recommended and pressed upon the attention of practical men by Mr. Bishop, in his "Casual Botany"—a book in which there is much originality, but too little known, and too little attended to. Mr. Bishop's ideas, however, should not be allowed to sleep, or be neglected ; every practical man may take up the expedient of cross-impregnation by way of experimental

\* In proof of this assertion, it has been just announced in the Quarterly Journal of Agriculture, that a new hybrid turnip has been raised by J. Wright, Esq., of Lawton, in Perthshire ; and a new variety of barley has been detected, and cultivated for three years by the intelligent Mr. Gorrie, of Annat, in the same county.

amusement, and, no doubt, many fortunate results would be the consequence.

Culinary vegetables are regarded more or less, according to their flavour, tenderness, colour, when dressed, or for their shape or size, and to which may be added, hardness and capability of being forced.

The flavour of a vegetable is a material qualification. What a difference exists between the early dwarf and the coarse drum-head cabbage, or between the early Dutch turnip and the Swede! Tenderness or crispness is much valued in all salad, or other plants partaken of in an undressed state; for instance, the salmon radish is preferred to the black Spanish; the coss lettuce to the brown Dutch cabbage variety. Endive would be a pleasanter salad plant, did it possess the crispness of the coss lettuce. The colour of vegetables are variously regarded at table: such as are called greens, cannot be too green when dressed; such are, asparagus, spinach, young cabbage, and broccoli, together with all sorts of pods or pulse. On the other hand, many cannot be too delicately white: such are, cauliflowers, young potatoes, and all plants which require blanching. White carrots would not be fancied, nor brown parsneps relished; neither are yellow turnips admired at table, though equally palatable, and much more nutritious than the white varieties.

The size of culinary vegetables is variously estimated, according to the purposes for which they are wanted; for genteel tables they are required of a moderate, or even of a small size, provided they are of the right colour and flavour; in other cases they can hardly be too large, if they be intended to be cut up before dressing, or if required for stews. Monstrous vegetables, especially if made so by art, are, however, seldom esteemed, being generally inferior to those of moderate growth.

Hardiness to withstand the severity of our winters is a valuable property of culinary vegetables; those of them which are liable to be killed by frost, occasion much care and labour to the gardener; and he must, of course, wish that the doctrine of *acclimation* were more practically possible than it has as yet been found to be. It is true that some hybrid exotics are hardier than one of the parent plants; and this circumstance affords room for hope, when the subject is better understood, that some advantages may arise from the endeavour to naturalise useful exotics.

The last property of kitchen vegetables which may be noticed, is their capability of being forced, for the purpose of having them at other than their natural seasons. Almost all the more delicate, and several

of the common sorts, are universally forced. This is only practicable, however, with those whose leaves, pods, or tubers, are useable in any stage of their growth, as radish, some sorts of lettuce, potatoes, carrots, and dwarf kidney-beans; to which may be added, sea-kale, rhubarb, mushrooms, and all sorts of small salad and seasoning herbs. These, it may be observed, are all used in their young and tender state, and when their flavour, rather than their bulk, is all that is wanted.

From the foregoing observations it will appear, that all plants of congenial natures are susceptible of sexual impressions from each other; that all our highly-improved varieties have been chiefly obtained by accidental impregnation, through the agency of winds or bees; and that, from so much being acquired fortuitously, much more may reasonably be expected from the manual assistance of practical experience.

Wherever, therefore, it may be desirable to improve by diminishing or increasing bulk, the pollen of the two extremes should be interchanged. The same rule applies with respect to every other property of cultivated plants, namely, precocity, flavour, crispness, colour, and hardiness; so that whenever any of these properties are sought to be transferred, the usual means of exchanging the pollen is to be had recourse to. For instance, it might be an improvement to have cauliflower as hardy as some species of broccoli; now if the selected sort of broccoli was managed so as to flower at the same time with the cauliflower, and the pollen exchanged, seeds of each ripened, sown, and planted out, we suspect,—indeed we are certain,—that a great many mongrel varieties would be the result; still there would be a chance that some of the half-breds, mostly resembling the cauliflower, might probably partake of a portion of the hardihood of the broccoli; and if not wholly on the first, a second or third trial might accomplish the object in view.

It is needless to point to other improvements of the like kind; they will readily occur to every one in the least conversant with gardening. Our object in saying so much, is more with the view of directing the attention of practical men to the subject, than laying down rules for their guidance.

## GARDEN ARCHITECTURE.

ON THE VARIOUS FORMS AND CHARACTERS OF ARBOURS AS OBJECTS OF USE OR ORNAMENT, EITHER IN GARDEN OR WILD SCENERY.

BY R. MALLET, ESQ., OF DUBLIN.

(Continued from p. 180.)

THERE are other walks or *berceaux* (which may be considered merely a sub-species of arbour) similarly covered, in one of which is an exquisitely beautiful fountain, called the Bell, from the form in which its waters issue; and issuing, run in a little clear stream, on a bright, pebbly bed, along the centre of the walk.

IN another more elaborate, but most tasteless part of this garden, is the far-fetched device of an arbour formed of jets d'eau. Surrounding an alcove made of agates, lapis lazuli, stained glass, &c., are arranged, at the height of about fifteen feet, a great number of leaden figures of birds, which, by turning a cock, all forthwith spout out water from their beaks into a surrounding basin, so as completely to inclose and imprison the party. A scene somewhat similar to this, but on a larger scale, also exists in the gardens of the palace of Pratolino, near Bologna, or, at least, did exist some time since. These are examples of false taste, alone fit to please children, whether great or small.

THE yew was a plant very commonly used for covering treillages, it was planted close, and kept clipped, which treatment it bears well. At the Borromean Islands, and also at an inn on the Lago di Lecco, there are arbours or bowers formed entirely of the roughest masonry, of glass-house clinkers, or ascoria; built like niches or semidomes, and covered completely on the outside with the various native sedums or sempervivium of Italy, some of which grow to a great size, with the top of each crowned by a great *Agave Americana*; while the whole interior was lined by a beautiful coating of that delicate fern the *Cheilanthes odora*.

THE general effect, although somewhat *outré*, was decidedly pleasing; but what looks *not* well under such a sun?

A singularly beautiful structure, which may be classed with this kind of garden decoration, has been made in Ireland. A circular space of about sixty feet in diameter, in the centre of dressed ground, with scattered clumps of evergreen shrubs, and surrounded by lofty trees, is wholly inclosed by a continued arcade of iron arches, each about five

feet wide by ten high, and formed of seven-eighth inch round bar-iron. The arches are Saxon gothic, and from the top of each proceeds a slight copper wire, to the summit of a pole placed in the centre of the circle, and about thirty feet in height ; so that as now described, the whole presents the appearance of a skeleton circular pavilion of arches, covered by a tent-like roof of the wire festoons. All the arches are thickly covered with climbing plants of strong rapid growth, which proceed along the wires to the topmost part of the pole. Many of those are climbing roses, and the exterior appearance of the whole, covered with a profuse variety of luxuriant climbers, interlacing and mingling their flowers and foliage, is exceedingly imposing.

The interior is an arbour of great magnitude, covered not so closely as everywhere absolutely to shut out the sun, but so closely as to render it always shady and agreeable. In the centre, a cooling fountain, from a group of nymphs supporting the pole, send forth four jets d'eau, which drop with delicious murmurs into a marble basin.

The closely-shaven turf comes about ten feet inside the arches, where its edge is cut, and between that and the basin is covered with a fine tawny sand, with an apparently confused, but really symmetrical arrangement of marble pedestals, seats, and great vases, with flowering plants in them placed upon it. During the summer, a vase with a rare flowering plant is placed under each of the external arches, except four, which serve as entrances.

The entire effect is very good. This may be considered as one of the best specimens of the artificial bower of the present day.

The skeleton of arbours in this, or in the old Italian or French style (fig. 5.), may be formed of wood, painted (the latter generally were so), or of metallic rods, which, when of a large size, may be of wrought or cast iron, and when small, of iron, or still better of copper wire. In our climate, where the ground-work or skeleton of an arbour may be kept always covered, the object should be, as much as possible, to conceal the artful contrivance of treillage, &c. by painting it green or brown, or ash-bark-grey. Where it is not desirable to conceal the treillage, white is the colour which best contrasts with the foliage, &c.

We shall now give a list of some plants which are peculiarly applicable to the covering of arbours in our climate.

*Vinca major*, five varieties

*Caprifolium*, all the varieties

*Lonicera implexa*, and many species

*Atragene Austriaca*

~~~~~ *Americana*

~~~~~ *Sibirica*

*Vitis labrusca*

~~~~~ *laciniosa*

~~~~~ *odoratissima*

~~~~~ *rotundifolia*

~~~~~ *arborea*

~~~~~ *blanda*

|                                                                           |                                                  |
|---------------------------------------------------------------------------|--------------------------------------------------|
| <i>Clematis triternata</i>                                                | <i>Ruscus reticulatus</i>                        |
| ..... <i>reticulata</i>                                                   | <i>Smilax aspera</i>                             |
| ..... <i>florida</i>                                                      | ..... <i>sarsaparilla</i>                        |
| ..... <i>viorna</i> , var. <i>flor. pur.</i>                              | ..... <i>horrida</i>                             |
| ..... <i>vitalba</i>                                                      | ..... <i>nigra</i>                               |
| ..... <i>orientalis</i>                                                   | ..... <i>Catalonica</i>                          |
| ..... <i>viticella</i> , var. <i>cœrul.</i>                               | ..... <i>Mauritanica</i>                         |
| ..... <i>Virginienis</i>                                                  | ..... <i>quadrangularis</i>                      |
| ..... <i>vitalba Canadensis</i>                                           | <i>Tamus communis</i>                            |
| <i>Ziziphus volubilis</i>                                                 | ..... <i>Croetica</i>                            |
| <i>Lycium barbatum</i>                                                    | <i>Dioscorea villosa</i>                         |
| <i>Polygonum volubili</i>                                                 | ..... <i>quaternata</i>                          |
| <i>Ampelopsis cordata</i>                                                 | <i>Periploca Græca</i>                           |
| ..... <i>hirsuta</i>                                                      | ..... <i>lævigata</i>                            |
| <i>Celastrus scandens</i>                                                 | ..... <i>angustifolia</i>                        |
| <i>Aristolochia pubescens</i>                                             | <i>Passiflora cœrulea</i>                        |
| ..... <i>sipho</i>                                                        | ..... var. 1, <i>cœruleo racemosa</i>            |
| ..... <i>tomentosa</i>                                                    | ..... 2, <i>alato cœruleo</i>                    |
| ..... <i>Arkansa</i>                                                      | ..... 3, <i>angustifolia</i>                     |
| ..... <i>bœtica</i>                                                       | ..... 4, <i>glaucophylla</i>                     |
| ..... <i>glauca</i>                                                       | ..... 5, <i>Colvillii</i>                        |
| <i>Rosa arvensis</i>                                                      | ..... <i>maculata</i>                            |
| ..... <i>canina</i>                                                       | ..... <i>Chinensis</i>                           |
| ..... <i>repanda</i>                                                      | ..... <i>edulis</i>                              |
| ..... <i>sempervirens</i>                                                 | <i>Rhus radicans</i> , and two varieties         |
| ..... <i>multiflora</i> , and numerous garden varieties, at least seventy | ..... <i>tridentata</i>                          |
| <i>Jasminum officinale</i> , and three varieties                          | <i>Bignonia radicans</i>                         |
| ..... <i>gracile</i>                                                      | ..... <i>major</i>                               |
| ..... <i>grandiflorum</i>                                                 | <i>Cissus antarctica</i>                         |
| ..... <i>revolutum</i>                                                    | ..... <i>Capensis</i>                            |
| ..... <i>Azoricum</i>                                                     | ..... <i>pentaphylla</i>                         |
| <i>Rubus fruticosus</i> , and three varieties ; with many other species   | ..... <i>elongata</i>                            |
| <i>Glycine frutescens</i>                                                 | ..... <i>quinata</i>                             |
| <i>Menispermum Canadensis</i>                                             | <i>Hedera helix</i> , five or six varieties      |
| ..... <i>Virginicum</i>                                                   | <i>Hibbertia volubilis</i>                       |
| ..... <i>Dauricum</i>                                                     | <i>Cobæa scandens</i>                            |
| ..... <i>smilacinum</i>                                                   | <i>Dolichos lignosus</i>                         |
| ..... <i>Lyoni</i>                                                        | <i>Lathyrus sylvestris</i>                       |
| <i>Ruscus androgynus</i>                                                  | ..... <i>latifolius</i> , and many other species |
| ..... <i>volubilis</i>                                                    | <i>Humulus lupulus</i>                           |
|                                                                           | <i>Bryonia alba</i> , and others                 |
|                                                                           | <i>Cucurbita</i> , various species.              |

We have thus given a list of most of the climbing and twining plants applicable to the purpose of arbours ; many of them are generally accounted tender, but are sufficiently hardy to stand, with a little protection, our ordinary winters ; some two or three are generally treated as stove plants, but the writer of this article has found them easily acclimated in Ireland, as noticed in the Gardener's Magazine for 1833.

It remains now to notice the appropriate localities for arbours before closing this article.

It is sufficiently obvious that the style of the arbour should be in keeping with the scene in which it is placed ; that the highly artificial and elaborate Italian arbour should not be placed in the midst of woodland scenery ; nor yet that formed of rough trunks of trees, in the midst of a trim parterre ; but that general harmony of design should be observed in this as in every other branch of landscape gardening.

The arbour should *in general* not thrust itself forward as a prominent feature of the scene, as this destroys the ideas of seclusion and repose that should connect themselves with it. To this, however, there may be some exceptions, as in the instance brought forward, where the arbour is ennobled into a kind of floral pavilion. Above all it should not have the appearance, however the reality may be, of being crammed into a corner merely to fill up an awkward space. In general the arbour should be situated in a close scene, but command an extensive and varied prospect. It will be judiciously placed, when possible, at the winding of some little stream, that "leaps musical from rock to rock," and alone breaks the silence of its embracing woods ; here gushing fiercely from betwixt contending rocks—and anon sleeping silent in a deep but transparent pool.

In such a spot the bower and *the bath* may be companions. Beyond the view may stretch along the lengthened valley, and rest far away upon the shadowy hills. Such are the scenes upon which the eye reposes in the plenitude of its enjoyment, and such, therefore, are the fittest situations for the arbour as a place of repose.

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#### OBSERVATIONS ON THE PRESENT TASTE AND STYLE OF ORNAMENTAL GARDENING.

As gardening was one of the first, so is it one of the most delightful occupations of man ; it contributes to his necessities, as well as to his comfort and pleasure. The cultivation of salutary herbs, and grain, and fruit for diet, were necessary to his existence ; and that of flowers for their scent and beauty, and of trees for shade and shelter, was equally necessary accompaniments. Hence the calling became divided into distinct branches, namely, kitchen, fruit, flower, and ornamental gardening. The two first, though of most real utility, are considered subordinate to the two last, more especially the last of all, which has been dignified by the title, "*landscape gardening*." The term has been borrowed from that given to any prospect of a country, but par-



ticularly from those works of art depicting wild or ornamental scenery, called landscape paintings, representing any space or region of a country, with its various objects.

The first ornamental gardens of which we have any good account were regular inclosures, with everything they contained arranged most symmetrically, justifying the often-quoted sarcastic couplet of our poet, Pope :—

“ Grove nods at grove, each alley has a brother,  
And one-half the lawn but just reflects the other.”

This rectilinear and rectangular style of gardening was, however, quite natural to man in the earlier ages of the world ; he saw Nature in all her wildest forms around him, and, as lord of the creation, he felt a kind of instinctive desire to bring her under his controul ; he wished a contrast and a disposition of his trees, and boundaries that would mark or secure his possessions, and, at the same time, exhibit his skill as well as his sovereignty. Art was then his idol, not Nature ; and everything he did was to show how much the latter was under his dominion.

This artificial style of gardening continued to prevail in every civilised country, from the earliest times till after the beginning of the eighteenth century. Before this epoch, Le Nôtre, a French garden architect and ornamental gardener, was extensively employed in almost every nation in Europe ; and some portions of his designs are still to be seen in France, and many imitations of them everywhere, as well in this country as on the Continent.

While Le Nôtre and his contemporaries were driving every trace of Nature from their garden scenes, the painter was at the same time enthusiastically engaged in studying her in her wildest forms, and copying every incident in real scenery which would improve his studies, or enrich his pictures.

Before the period to which we are alluding, many eminent painters had immortalised their fame by the beautiful landscapes which they had painted. Among these celebrated paintings, it is remarkable that very few trim garden-scenes were represented, especially as the artists, both gardeners and painters, were very probably admirers of each other. This, however, is only an instance of how much the human mind is liable to be enchained by custom or reigning fashion. The idea had not yet been entertained, perhaps, that the principles of ornamental gardening and landscape painting are the same ; for, in practice at that time, the artists took directly contrary routes : the painter studied Nature only, while the gardener busied himself in cutting and slashing

vegetation into all the most fantastic regular figures his ingenuity could invent. Geometry, with its lines and rules, was his text-book ; without this he could not trace a line, or prune a tree, or trim a hedge. On the other hand, Nature, in all her varied forms, and habits, and hues, was seized and imitated by the painter, tracing her on the mountain steep, or in the secluded dell—by the sparkling river side, or on the banks of the placid lake.

Thus, at one time, were painters and gardeners employed, both occupied in arranging the same objects ; the one forming real, the other pictorial scenery, but with very different views : the first was enamoured of “ neglect and accident ;” the other seriously annoyed if a single leaf projected from the smooth surface the shears had made.

The love of gardening and of fine pictures, however, kept pace with each other, and were often united in the same cultivated mind ; indeed, we seldom meet a virtuoso who is not equally enamoured of all the fine arts. Both gardeners and painters were employed in the embellishment of regal, noble, ecclesiastical, and manorial residences. While the exterior was graced and adorned by the former, the interior was decorated and enriched by the latter. The painter’s landscape at last “ bore away the bell ;” the admirable scenes presented on canvas were extolled by every unsophisticated eye, and merely because they were more true to nature ; and when compared with the most laboured garden dispositions, the latter sunk in public estimation, and was soon followed by the cry—*Why is not every gardener a painter ?*

This impression was so strong after the new light broke in upon the minds of the *cognoscenti*, that Kent, a painter by profession, was actually induced to become landscape gardener. His new task was not a pleasant one ; he aimed at producing *immediate effect*, as he used to do in his *studio* ; but this was impracticable, as he found he must wait many years before he could possibly see the full effects of his dispositions of trees, shrubs, &c.

The first attempt by Kent was certainly a failure, because, in straining to do on the naked lawn what is so easily done on the canvas, he made himself ridiculous, by planting dead trees, and several other freaks, which, however unobjectionable as the effects of time or accident in real scenery, become quite ludicrous if imitated by art and labour.

But as many places at that period were capable of great improvement by merely clearing away redundant growths, the painter’s ideas were in such cases highly valuable, and their assistance was duly acknowledged ; and consequently improvement by abstraction, or simply clearing away, became the rage. Hence a reformation (by far

too radical however) took place. Every connoisseur wondered how the contracted ideas of the gardener could have been so long tolerated; a kind of remorse was felt that the visual enjoyment of real pictures should have been so long withheld; a sweeping sentence of condemnation was instantly pronounced by the arbiters of fine taste, and open war was declared against every right line and right angle, and against every perpendicular form of Dutch or Italian gardening.

Soon were the venerable avenues uprooted—the airy terrace and the verdant slope levelled with the general surface of the ground; every nicely-clipped hedge or arcade, pyramid or globe, were quickly banished from the lawn and gardens; right lines, whether of roads, or walks, or fences, were diverted into regularly flowing sweeps; the mansion which had been for years partially shaded and veiled by trees, was set out and exposed on a smooth and closely-shaven lawn; hedge-row trees were exchanged for insulated clumps dotted over hill and dale; and straight and visible fences gave way to crooked and invisible Ha! ha's!

Thus the regularity of the old style was excluded, to admit the irregularity of the new; a change too recklessly made, and which has proved, in many instances, only a change from one kind of sameness to another fully as tedious and uninteresting.

Nor was the new style an imitation of what it was presumed to be founded on, namely, the painter's ideas of the most beautiful or most picturesque combinations of land, wood, and water. The opinion of the first reformers appeared to be, that, to depart as much as possible from the old style, by introducing irregularity, was all that was wanted to give the new scenery a truly natural character.

The new style received the title of “English gardening;” and certainly there were some very perfect things of the kind executed in different parts of the kingdom, not, however, by clearing all the old features away, but by a judicious reservation of part of them, and not by an implicit adoption of every suggestion of the reformers, but by a tasteful rejection of many of their dogmas.

It is perfectly true, that, though the guiding principles of composition of both the painter and the landscape gardener are the same, there must necessarily be a great difference in the execution; the one endeavours to gratify the present, the other future generations. The painter can brighten his lights, deepen his shadows, give play to his outlines, and mellow his tints at pleasure, so as to preserve a well-balanced display of light and shade; all his objects, whether on the foreground, in the middle distance, or in the off-scape, he can dispose as seems to him best. The height, and distance, and form of the mountains; the character and extent of water; the very forms of the

clouds, and tints of the sky, are all as his fancy or taste suggests. And neither is the painter confined to the real character of the trees, and shrubs, and herbs which he introduces into his picture ; a burdock, or other monstrous weed on his foreground, answers his purpose as well as the finest plant in cultivation. Such worthless plants in a painting give no offence to the beholder in any way ; and, moreover, the rudest, wildest scene may be preferred for the canvas, but which is seldom or never required to be, nor indeed ever should be formed by the gardener, because the most trifling mark of art about such a work robs it of every charm which it would otherwise possess.

The landscape gardener arranges all the ornamental planting of the park, and particularly near the house. Here comfort, convenience, cleanliness, and every other sign of high keeping and art must prevail ; here all the taste and skill of the gardener should be displayed ; here his ideas are peculiarly applicable ; and when these foreground dispositions are fixed, he has to design and connect the scenery of the park therewith, and that of the surrounding country with both.

In the execution of all this, the most refined taste, united with a large share of practical, botanical, and arboricultural knowledge, is absolutely necessary ; and in this it is said the professional ideas of the painter would be available. Let us suppose, then, that a Claude Lorraine were engaged with the gardener in laying out an English garden ; the trim neatness, smoothness, and regular edges of the walks and borders of the latter, would offend the eye of the former, who would rather see roughness, intricacy, and indistinctness prevail. This, however, would not be suffered near the abode of refinement and affluence ; but the painter would advise the gardener to conceal his hard lines ; to break the uniformity of the clumps ; to give variety to the masses of planting, by associations of trees and shrubs of different tints and character ; to place on the foreground the strongest growing herbs, the coarsest featured shrubs, and the quickest growing trees to flank the vistas which he would wish to have extended across the park, or which would let in distant objects of interest in the country beyond. The painter would also advise but few single trees to be planted, without having a few shrub-like growths near their base ; and also that all clumps and groups should be of one kind of tree, irregular in outline, and intermixed with under-growths, to creep out on the turf around them.

If water entered into the composition, the painter would advise it to be disposed in its natural place—the lowest ground ; and whether a lake or river, he would have it as unlike a canal as possible. The natural abruptness of the banks he would preserve, as well as all their

sinuosities and overhanging trees and bushes. Nor would he be anxious to expose too much of the water in one place, unless it would appear as a reach, either advancing towards or receding from the eye, for the sake of the reflections from the ripple on its surface. If a lake, he would choose to have it of a very irregular shape, and as much diversified by trees and islands as its size would allow, carefully masking its extremities, if such were too visible.

If buildings of any description, either for use or ornament, were in the landscape, the painter would advise them to be partly concealed, and only allowing the most ornamental or characteristic angle to jut out from among trees. If the park was of a finely undulating surface, consisted of smoothly-rounded knolls, with winding dips between, the painter would adapt the forms of his groups and thickets, and the characters of the trees to correspond. On the other hand, if the environs presented strong natural features, as cliffs and rugged declivities, deep ravines forming the beds of mountain streams, &c., he would add such accompaniments of vegetation, alpine and aquatic trees, &c., as would harmonise with the general aspect of the place, so as to produce (whatever may be the character of the district) a well-connected and harmonious whole.

Now if all this would be advised by a painter, or an amateur having "a painter's eye," it differs not a jot from what would be done by every landscape gardener who knows his business, or who deserves the name. Hiding the hard lines in the dressed ground, and employing more under-growths among the trees in the park, are the only additional amendments in the common practice, which the painter could recommend in laying out a park in the English style. He would also object to any great extent of lawn being seen from any principal station, because nothing is so horrifying to a painter as great blotches of any one colour on the canvas, without chequering of shadows, of flocks or herds, or of other objects admitting variety of tints; and therefore a park laid out by a painter would be rather a series of diverging glades, than a park dignified by the grandeur of its vast masses of wood, and its expansive extent of verdant turf.

That many of our parks, laid out in the style last alluded to, are lifeless and uninteresting, must be acknowledged. In passing through them, though they may have an air of grandeur suitable enough for a regal or ducal palace; yet no part of such scenery would be admired by the painter, because wholly unfit for the canvas. Hence it may be inferred that an English landscape-gardener's park may be very suitable for a residence, and yet by no means equal to the *beau ideal* of a connoisseur, who may be blessed or plagued by possessing a

painter's eye. Still it is very possible to bring the extremes nearer together; to diversify and enrich the naked tameness of the "capability" style; and to soften the asperities, and qualify the exuberance of imagination observable in some of the most celebrated paintings.

How this may be done, we shall reserve for another opportunity, more especially as a friend has promised us a series of letters on this very subject; and as he intends to tell us not only what may be, but what has actually been done, the information, it is hoped, will not be unacceptable to our readers.

## BOTANY.

### ON THE STUDY OF THE SCIENCE OF BOTANY.

BY F. F. ASHFORD.

(Continued from p. 186.)

This class contains the most beautiful of the herbaceous plants of our gardens. With a few exceptions, it is, to a considerable degree, a natural assemblage, comprehending a large proportion of those favourites of gardeners, the orders of *Amaryllideæ*, *Asphodeleæ*, *Bromeliaceæ*, *Liliaceæ*, and *Melanthaceæ*; also a few grasses and palms, some genera of *Berberideæ*, all *Hypoxideæ*, and many *Junceæ*. The hot-house *Amaryllideæ*, or lilies of the valley, consists of a number of beautiful species. Among the *Bromeliaceæ* are found the delicious pineapple (*Ananas sativa*), and the curious Tillandsias, some of which are called air plants. The asparagus (*Asparagus officinalis*), and the officinal squill (*Ornithogalum squilla*), belong to *Asphodeleæ*. The *Phormium tenax*, which produces the strong flax of New Zealand; the Aloes, curious for their fantastic foliage; the fragrant tuberose (*Polianthes tuberosus*); the plantains (*Musæ*), so valuable as an important article of food in all the tropics, are all contained in this class. Hither also is referred the valuable rice (*Oryza sativa*), the curious bamboo (*Bambusa arundinacea*), and the rush (*Juncus conglomeratus*), some of the species of which are well known for their use in economical purposes; others as the most worthless weeds of our heaths. Orders four, viz.

*Monogynia*; *Galanthus nivalis*, the humble snow-drop.

*Digynia*; *Atraphaxis undulata*.

*Trigynia*; *Rumex acetosa*, common sorrel.

*Polygynia*; *Alisma ranunculoides*, the lesser water plantain.

## Classis VII.—HEPTANDRIA.

*Heptandria*, from *hepte*, seven, and *anēr*, a man; meaning that this class bears bisexual flowers, that are furnished with seven husbands or stamens.



A very small class, of which the *Parinarium*, which is a good tropical fruit, and the horse-chestnut (*Æsculus*) are the only remarkable genera. The *Astranthus* is a curious genus of the natural order of *Homalineæ*. Orders four, viz.

*Monogynia* ; *Disandra prostrata*.

*Digynia* ; *Limeum Africanum*, the only one contained in this order.

*Tetragynia* ; *Saururus cernuus*.

*Heptagynia* ; *hepta*, seven, and *gynē*, a woman ; flowers furnished with seven styles ; *Septas umbella*.

## Classis VIII.—OCTANDRIA.

*Octandria*, from *octa*, eight, and *anēr*, a man ; signifying that this class bears bisexual flowers, furnished with eight husbands, stamens, or male organs of generation.



This class, which, with reference to the plants which compose it, is of much consequence to the botanist and gardener. To the former it is recommended by the singular melastomaceous plants which it contains, the curious *Michauxia*, and the *Jeffersonia*, remarkable for its capsule, which opens like a snuff-box. To the gardener it possesses irresistible attraction, not only in the delightful *Tetralathas*, *Boronias*, and *Correas* of New Holland ; in the *Euphoria* of China, celebrated for its truly excellent fruits ; and in the *Fuchsias*, *Enotheras*, *Combretums*, and *Vacciniums*, some of which form the pride of our hardy gardens ; but also in the magnificent tribe of heaths, which are certainly the most beautiful plants in cultivation. Orders four, viz.

*Monogynia* ; *Bæchia virgata*.

*Digynia* ; *Galenia Africana*.

*Trigynia* ; *Seriana sinuata*.

*Tetragynia* ; *Paris quadrifolia*.

## Classis IX.—ENNEANDRIA.

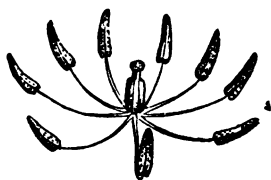
*Enneandria*, from *ennea*, nine, and *anēr*, a man; flowers furnished with nine stamens.

One of the smallest of the Linnæan classes, containing, however, three important genera: the laurel (*Laurus*), for the valuable spices it produces, and for the beautiful foliage of its allied species; the Cashew-nut (*Anacardium occidentale*), known at the tables of the great or luxurious; and the rhubarb (*Rheum*), one of the most valuable of medicines. Orders three, viz.

*Monogynia*; *Cassythia filiformis*.

*Trigynia*; *Rheum undulatum*.

*Hexagynia*, from *hex*, six, and *gyne*, a woman; flowers furnished with six styles; *Butomus umbellatus*.



## Classis X.—DECANDRIA.

*Decandria*, from *deka*, ten, and *anēr*, a man; signifying that this class bears flowers that are bisexual, and furnished with ten husbands, stamens, or male organs.

This class is composed of portions of a considerable number of natural orders, of which the most important is *Leguminosæ*: these are of two kinds—those which are papilionaceous, and those which have a regular expanded flower. The former are remarkable, for their kind, for bearing distinct stamens, combined with a papilionaceous corolla. The greater part are natives of New Holland or the Cape of Good Hope, a very few of the northern hemisphere, and all of them ornamental plants. Of those with regular flowers, the most beautiful genus is the *Bauhinia*, which, in the latitudes of the tropics, constitutes the most formidable obstacle to the passage of human beings through the woods, which are interlaced in every direction by the climbing or leaning stems of these and other plants, commonly called *Lianes*. The most extensive genus is *Cassia*, the species of which is little esteemed as objects of ornament, but of material importance in medicine, the famous senna of the shops being





the produce of three species, *C. Italica*, *senna*, and *orientalis*. The *Hæmatoxylon* (logwood), and *Swietenia* (mahogany), belong to this class, as does the important quassia drug (*Q. amara*), the beautiful tribes of *Kalmias*, *Rhododendron*, and *Andromedas*, with the extensive genus *Silene*, and the beautiful *Dianthus*, out of which the fine carnations (*D. caryophyllus*), pinks, and picotees of the florist have been obtained. Orders five, viz.

*Monogynia* ; *Ormosia dasycarpa*.

*Digynia* ; *Saxifraga ligulata*.

*Trigynia* ; *Stellaria nemorum*.

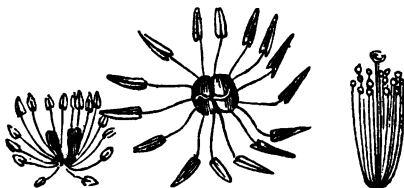
*Pentagynia* ; *Averrhoa bilimbi*.

*Decagynia*, from *deka*, ten, and *gyne*, a woman ; flowers furnished with ten styles ; *Phytolacea decandra*.

#### Classis XI.—DODECANDRIA.

*Dodecandria*, from *dodeka*, twelve, and *anēr*, a man ; signifying that this class is furnished with bisexual flowers, and from eleven to nineteen stamens inclusive.

This is a small incongruous class, containing no extensive genus of importance, except *Euphorbia*. Its orders are six, viz.



*Monogynia* ; *Blakea trinerva*.

*Digynia* ; *Agrimonia eupatoria*.

*Trigynia* ; *Reseda odorata frutescens*, tree mignonette.

*Tetragynia* ; *Calligonum Pallasia*.

*Pentagynia* ; *Gastonia palmata*.

*Dodecagynia*, from *dodeka*, twelve, and *gyne*, a woman ; flowers furnished with twelve styles ; *Sempervivum arboreum*.

(To be continued.)

## MISCELLANEOUS INTELLIGENCE.

## THE SWEET LEMON.

*To the Editor of the Horticultural Register.*

Sir,—I make no doubt the sweet lemon of which you have made some mention at page 192, vol. iv., is a distinct species, instead of having been produced by grafting the sour lemon on the orange. The first time I ever heard of, or met with this fruit, was some years since at the village of Ximena in the province of Andalusia, where I observed a boy about five years old, eating a common sized lemon, and at the same time, the acidity which I concluded it possessed, not having more effect on his countenance than if he had been partaking of a thoroughly ripe orange; this circumstance attracted my attention, and while gazing at the child, a resident of the place approached me, to whom I communicated the cause of my surprise, when he informed me, that the lemon I noticed was perfectly sweet, and that the fruit was by no means uncommon in that part of the country.

There is an oak, a native of Western Barbary, that produces acorns which, for sweetness and flavour, so nearly resemble the almond, that had this variety been known to the informant from the Azores, he would in all probability have also gravely announced for the information of the credulous, that these qualities were occasioned by grafting the oak on the sweet almond.

HIJO DE ESPAÑA.

May 11th, 1835.

**CHENOPodium QUINOA.**—This plant is cultivated in the warmer parts of North America, and extensively in Chile and Peru, its leaves being eaten as spinach or sorrel, and its seeds as rice. It is also used in the preparation of a kind of beer. Dombey, on his return from Peru, endeavoured to introduce the plant as a culinary vegetable into France, but without success. From a dried specimen of the plant grown in England last year, and exhibited at a meeting of the Linnæan Society, by A. B. Lambert, Esq. V.P.L.S., it appeared, in habit, very like the strong growing British *chenopodiums*, but we should think the seeds are far too small to be ever equal in value to any of our cereals; and certainly inferior to the white beet as a substitute for spinach.

**INQUIRY RESPECTING A DEFECT IN GRAPES.**—F. Ashford would be thankful if a paper would be inserted in the Register concerning the cause, prevention, and cure of certain berries in bunches of *grapes*

becoming spotty and finally mouldy, particularly in the kinds of *white Portugal* and *Syrian*.

We should be glad of further information on the malady alluded to by our correspondent, and hope that what he has proposed for illustration will be answered by some one of our readers ; or that the matter will be further treated of by Mr. A. himself, who is so well able to expatiate on this, or any other subject of horticulture.

**METROPOLITAN SOCIETY OF FLORISTS AND AMATEURS.**—The following were the subjects exhibited for prizes at their last meeting, viz., the best six plants of *Orchideæ*, the best six stove plants not orchideæ; and similar numbers of heath, geraniums, other greenhouse plants, *Calceolarias*, hardy American plants, hardy *Rhododendrons*, hardy azalias ; the best twelve hardy and half-hardy dissimilar varieties of heart's-ease ; the best one hundred ditto ; the best twelve tulips ; the best single specimen plants ; and the best thirty-six varieties of cut flowers. We insert the above to show our distant or future readers, what the rage now is for flowers and flowering plants.

**FLORICULTURE.**—Among the many improvements made in the cultivation of flowers the methods invented for retarding their flowering is one. It has been the opinion of many naturalists that the annual development of flowers yields more real satisfaction than if all were ever-flowering ; that their disappearance for a season enhances the value of their return ; and as they succeed each other in a continual round, the loss of any one particular sort is never regretted. These ideas are much more applicable to herbaceous flowers, than those of shrubs or trees. The latter indeed, we have but little controul over, but shrubs are easy of management, and many of them are so beautiful in flowering and at the same time so finely scented that, we never can be tired of either their forms, colours, or fragrance.

It is long since the method of procuring a late bloom of *ranunculus*, *anemones*, and *roses* has been practised. This was by late planting the tubers of the two former, and double pruning the flowering shoots of the latter. Double pruning is performed in autumn and again in April ; in the first, five or six buds are left on the shoot, of these two or three will burst in the spring and would flower in June : but if these be pruned off after shooting a little the lower buds will burst and yield their flowers a month later than the usual time.

Whether this treatment of the rose-tree has been carried as far as it

may be is uncertain, and neither is there now so much occasion for the practice ; because such are the vast variety of roses yielding flowers at many different seasons, that a garden need never be destitute of roses, especially if different periods of pruning them be attended to.

But there are other shrubs, besides rose-trees, of which the flowering season may be protracted, to the great enrichment of the flower-garden. Both the *Laurustine*, and *Althea frutex* may be so managed as to produce their flowers at unusual seasons. The first, instead of flowering in the very early spring, may be, by removal, made to flower in autumn or late in the spring. The latter by the same means may have their flowering delayed till autumn. Several other shrubs, as the different varieties of the *Cytisus* and others, may be susceptible of such management by the knife or spade as may cause them to yield a succession of flowers, making them doubly valuable as ornamental plants. We would beg to call the attention of our readers to this subject as one which has not engaged their thoughts so much perhaps as it deserves.

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#### ON THE CULTURE OF THE DAHLIA.

BY G. T. DALE, WIRKSWORTH, DERBYSHIRE.

THIS class of plants is one of the most beautiful in the world ; indeed we may truly call it magnificent. It possesses also decided advantages over most other flowers, not only as regards the great variety and brilliancy of its colours, from the most glaring scarlet to the delicate pencil work, but also in the length of time it continues to bloom ; as well as the great facility with which it may be propagated.

I am induced to make a few observations on the culture of the Dahlia, because I believe nine out of every ten are treating their plants in a manner contrary to their nature. Nearly all the growers of this plant tell me it is of the same nature as the potato, and consequently must be cultivated in a similar way. That it is of the same nature I deny ; but even granting this, certainly they have a different object in view in growing a flower to what they have in growing a tuber. In most gardens we see the plant grown to a large size, indeed often so large that it requires all the support of rich land, and often large quantities of manured liquor as well. This, to me, seems decidedly a wrong method of growing the Dahlia. I should say the smaller you have the root and the less top you have, the better will be the flower both as to colour and form.

Though I do not for a moment suppose but that great improvement may be made in the method I am about to lay down, yet the bes

Dahlias I ever saw were grown in a similar way. The plants grown this way will be much smaller than those generally seen, but I will venture to say those who try it will not be disappointed in the blooming of their flowers.

In the first place, do not attempt to strike the roots until the latter end of February. When they have made shoots four inches long pot them off into a composition of one-half river-sand, one-fourth good turf soil, and one-fourth leaf soil; and as soon as the weather will allow, turn them out into the borders. The soil I recommend is the following:

One fourth, strong loam.

One fourth, leaf soil.

One fourth, fresh turf soil.

One fourth, river sand.

On no account use strong manure, and when the flowering season is over, cover the roots with sand, till you take them up on some fine day, for the winter; removing all the soil carefully from the roots, and place them on dry shelves in sand, where the frost cannot reach them.

May 11th, 1835.

## CALENDARIAL MEMORANDA FOR JUNE.

### KITCHEN GARDEN.

*Common Beans.*—The last crop of the season may be sown in an open situation before the tenth of the month. The Mazagan sort should be preferred, as most likely to succeed. The earlier crops will require looking to, lest the fly have settled on their tops; in which case they should be topped, as well to kill the insects as to assist the pods to fill.

*Peas.*—The last crops of peas must also be sown in this month. For the first and last sowings, the Prussian blue or pearl; and for the two intermediate sowings, Knight's marrow. If the ground be dry, steep the seeds for four or five hours before sowing, or water the drills well before sowing. Knight's marrow-pea not only requires to be laid in very moist soil, but also copious waterings during August and September, if these months be dry, to set the flowers and fill the pods, and, moreover, to prevent the attack of mildew. The bearing and advancing crops of peas may require earthing up, sticking, and watering also, if drought prevails.

**Kidney Beans.**—Succession sowings of both dwarf and runner sorts should now be sown ; of the former thrice, and of the latter twice : the first in shallow drills, thirty inches apart, and sprinkled with water before sowing ; the second in single, or if double rows, from four or five feet apart, and also assisted by watering, if necessary. The advancing crops should be hoed among, and timely sticked after earthing up.

**Cauliflowers**—Are now in perfection. Preserve the colour by shading with their own leaves. Give water to the backward plants, if the weather or soil be dry. Prick out the seedlings intended for the Michaelmas crop in an open spot, to get strength before they are put out for good in July or beginning of August.

**Cabbage.**—Moderate quantities of cabbage plants should be drawn from the previously sown seed or nursery beds, to keep up a constant supply of this vegetable in its most perfect state. Cabbage are apt to be stunted by drought, and disfigured by insects during summer ; plentiful watering is the only remedy. Sow twice in this month, at the beginning and near the end ; the first may, by proper subsequent management, be called autumn cabbage ; the second, coleworts.

**Broccoli.**—Now put in full crops of broccoli ; all the sorts require well-dunged and deep-digged ground. Place the plants in rows, at distances according to their bulk of growth—say two feet every way for dwarfs, and from thirty to thirty-six inches apart for the strong-growing kinds. Dibbed in furrows drawn by the hoe facilitates watering, which is requisite at planting, as frequently afterwards in dry weather. Continue to prick out seedlings from former sowings into nursing-beds ; this induces a stocky growth, and consequently finer heads. About the beginning of the month sow the latest hardy sorts, as the Siberian and hardy purple or green varieties.

**Leeks.**—Draw from the seed-beds the strongest plants ; trim their tops and longest fibres a little ; dip them in puddle made with rich earth and water, and dib them in furrows made by the hoe, six inches apart from each other, and twelve intervals between the rows. It is well to insert the plants rather deeply in the hollow, pressing the earth firmly upon the fibres, but leaving a hollow space round the stem ; this effects the lengthening of the blanched part of the latter more than if planted on the surface.

**Carrots.**—The advancing crops must be kept free from weeds, and carefully thinned, as advised last month ; and if a moderate-sized bed for drawing young during autumn was not sown last month, it may now be done.

**Savoy Cabbage.**—Plant out a succession crop of this vegetable for winter use ; also all the kindred kinds of greens, namely, borecole,

Brussels sprouts, &c. These are hardy plants, and yield acceptable supplies of tender greens in spring, when other green products are scarce. The intervals between early crops of peas, beans, or other rowed crops, which soon come off, are usually chosen for these winter greens.

*Celery*.—Continue to plant out celery in trenches, from time to time, as the previously pricked out seedlings become fit; this is better than planting too many trenches at once from any one (particularly the earliest) sowing. It has been too much the practice to plant the whole crop from one sowing, and at the same time; this, for such a vegetable as celery, is not well, because, as it is gradually used in a private family, it should be consecutively sowed, transplanted, and taken up; therefore prick out another lot of seedlings from the April sowings, to be ready for putting in trenches in July. Watering and shading for a few days is necessary, if the weather be dry and warm.

*Red Beet, Scorzonera, Salsafy, and Hamburgh Parsley*.—All these crops will now require hoeing among to kill weeds, and to see that they are all thinned enough.

*Love-Apples*.—These plants, if still in the pit or frames, may now be brought and turned out of the pots under a south or west wall or paling, to which they may be trained while bearing. Capsicums may also be turned out on warm borders, to produce their fruit.

*Lettuce*.—Transplant from seed-beds all the different sorts. Showery weather is most suitable; and if dry, plentiful waterings and shading will be necessary, till the plants have struck fresh roots. Sow more seed twice in the course of the month.

*Turnips*.—Sow another crop to succeed that sown in May. Hoe and thin out former sowings, and draw for use from the thickest parts.

*Spinach*.—Sow twice in the course of the month.

*Salad Plants*.—Cress, mustard, and rape should be sowed once a week, to obtain a constant supply. The different sorts of radish may yet be sown; but to have them of quick growth and crisp, they will require copious watering.

*Endive*.—Sow a large seed-bed of the green curled sort, and a smaller one of the Batavian about the twentieth of the month. These beds will supply plants for the principal winter crops.

*Cucumbers*.—See that the ridged plants are attended to by giving air daily, and water occasionally. Picklers may now be sown on a warm border in patches; or if plants have been previously raised in a hot-bed or hot-house, they may now be put out. Placing three plants together is the usual way of disposing them, and this because it gives oppor-

tunity to put half a barrowful of rich compost at every station, for the plants (or seeds) to be plunged in.

*Cardoons*.—Where this vegetable is required, if not sown last month, it is not too late to sow in the beginning of this. The seeds may be sown in shallow trenches made in the manner of those for celery, and made rich by digging in dung or compost in the bottom. When the seedlings have advanced three or four inches high, thin them to ten or twelve-inch distances, in order to give room for each to be tied up and blanched at the proper season.

*Asparagus*.—Shoots continue to rise, but they should be sparingly cut at this season; and, indeed, cutting should cease after the middle of the month, otherwise the strength of the roots would be too much exhausted, and hurt the crop of the next year.

*Onions*.—Should be kept perfectly clean, and not too much crowded together. When the largest sized are wanted, a portion of the crop may be left very thin—say eight or ten inches apart, to encourage luxuriance. A small bed may be sown to draw young for salad.

*Herbs*.—Propagate sage, hyssop, &c., by cuttings; and thyme, borage, marigold, savory, and sweet marjoram by seed. Any that were sown last year, standing too thickly, should be thinned.

The general business of this month, besides what has been specified above, is destroying weeds everywhere, together with slugs, snails, and all kinds of hurtful insects in and about the garden.

#### MANAGEMENT OF WALL AND FORCED FRUITS DURING JUNE.

*Apricot Trees*.—Although we might refer to what was advised last month respecting these and other wall-trees as the rule for the manager's duties in this, yet the treatment of such trees, both in the last and present month, is a matter of so much importance, that we cannot help again alluding to it. It has already been hinted that the form, health, and fruitfulness of a wall-tree depends much more on the summer than on the winter pruning. By regulating the growth in the latter season, the rising sap is kept in the desired channels, and none allowed to run to waste in the production of useless luxuriance. The state of a tree, whether of a weakly or over-luxuriant growth, enables the manager, at this season, to assist the one, or check the other. The stunted or feeble-conditioned tree may receive additional vigour by being permitted to produce a diminished number of well-placed shoots only; and if fruitful, as such trees generally are, a very diminished number of fruit. If, moreover, the shoots thus reduced in number be laid in in as erect positions as possible during the summer growth, will very much assist



to gain an accession of constitutional strength. On the other hand, if a wall or espalier tree be in a too rampant state of growth, rubbing off every bold bud appearing on the stronger branches, and retaining those on the smaller, and in their progress bending them downwards in laying in, will all operate to induce moderate growth, more especially if such treatment be continued for a few consecutive years. For the same reason, such a tree should be suffered to ripen every fruit that sets upon it, to cause a more moderate flow of the sap in future years. Such desirable results can only be obtained by a judicious ordering of the trees at this season; and if this has not been already done, it should be done without delay.

All wall and espalier trees should receive this attention and regulation; apples, pears, and plums, as well as peaches, nectarines, and apricots.

*Thinning Fruit.*—This is a necessary part of the gardener's employment in this month, and should never be omitted. The kinds just named very often require to be eased of their superfluous burdens, as well for the good of the trees as for securing a competent crop of fruit, superior in size as well as flavour. Morella cherries on north walls are also capable of being greatly improved in size by proper thinning, soon after the crop are fairly set.

*Peachery.*—The first forced division of the peach-house will now contain ripening, or ripe fruit. To enhance the flavour, keep the house dry and airy. During the time the fruit are swelling off, a higher temperature should be afforded, as noticed last month.

*Vinery.*—Thinning and tying up the shoulders of the bunches, and keeping the shoots trimmed and in their proper places, is the chief business here at this season. Be guarded against cold damp air after the fruit are ripe.

Vines on the open walls also require particular attendance at this season. The young bunches will now be visible, and if trained on the spur-system, each fruit-bearing shoot should be stopped at the next joint beyond the fruit, divesting the trees at the same time of all laterals and tendrils. If the vines be trained on the successional long-shoot system, of course the leading shoots are carried forward in a right direction, clearing them of tendrils and of laterals (above their first joint) as they proceed, and ultimately stopping them when they have gained the full height. We may here stop to explain why the laterals are stopped above the first joint, and not entirely taken off, as is the custom of some vine-dressers. The reason is this:—were the laterals pinched off close, the bud at their base, which contains the fruit of the next year, is very apt to burst in the autumn of this year,

and so become useless for the service of the next. This is the more likely to happen when it becomes necessary to stop the leader. All the fruit-bearing side shoots should be stopped beyond the fruit, and they also denuded of tendrils and superfluous shoots; for if these be allowed to hang from the wall, and become entangled with each other, it is a task of great labour and difficulty to get the shoots into order again.

*Cherry-House, Pinery, and Figgery.*—In all these the fruit are ripe, or ripening, and receive that care and attention which their progress towards maturity require. Fruit quite or nearly ripe, require to be kept dry and airy, to heighten the flavour; those swelling off, a higher temperature both night and day. ●

Small fruit-trees, as gooseberries and currants, are greatly assisted in producing large and high-flavoured fruit, by freeing them of all redundant summer-shoots at this time. This is not unnecessary labour, when the cultivator is desirous of supplying the table with the finest specimens of even inferior fruit.

Strawberries in the open ground being now in flower, require, in dry weather, good *soakings* of water to insure plentiful crops. Slugs are a pest to this crop, but not many will show themselves, if the beds have been drenched once or twice with lime-water during the month of April.

Preserving fruit from birds is a necessary precaution. Cherries, as well as strawberries, are particularly inviting, and must be netted, or the pilferers scared away by some means or other.

The attack of insects must also be guarded against, as well those which live on the juice of the leaves as on that of the fruit. In the hot-bed frames, where cucumbers are now plentiful, and melons setting and swelling, wood-lice are troublesome. Small flower-pots filled with soft hay, damped with sugared water, are good traps for the capture of wood-lice, as well as earwigs. Entomologists preserve their insects in cabinets, by keeping the latter saturated with the *effluvia* of camphor, which proves offensive to all living insects which would prey on the dead. Why should not this be tried in frames and hot-houses?

#### BUSINESS OF THE FLOWER GARDEN IN JUNE.

*Dahlias.*—If not already turned out of pots into the places where they are to flower, should now be done. Stake the brittle stems, if there be danger from wind; situation sheltered, but not shady; fresh soil, and not that, if possible, where they grew last year. Rich loam and road-sand is a good compost for the dahlia. Prick out seedlings, if not done before.

*Auriculas*.—May now be shifted. Be careful that the pots be perfectly clean and well drained.

*Tulip*, *Hyacinth*, and *Ranunculus* beds, or stands, should still be shaded, if necessary. Carnations in pots require good nursing, by being assisted to grow strongly by applications of manured water. All sorts of tender and half-hardy annuals and perennials may now be set out in the open borders. Sow in hot-beds successions of stocks, and any annuals wished to blow late. Transplant annuals previously sown too thick. Plunge in the borders all sorts of green-house plants which can be spared from the collection, and which flower so readily in the open air, as petunias, fuchsias, &c. Sow biennials, as sweet-williams, champions, &c. Again, prune down roses for a late bloom; strike cuttings of ericas and other green-house plants; also slips of double wall-flowers, and others of similar character. This is likewise a good time to prepare a slight hot-bed for striking cuttings of both hot-house and green-house plants.

The general collection of green-house plants should now be removed to their summer station, if not already done. It is customary to shift the principal part of them on this occasion; and as it is a scene of disorder and bustle, every preparation should be previously made to get it over as quickly as possible. Different kinds of compost, pots, crocks, props, ties, &c., should all be got ready, so that the house may be cleared, cleaned, and again furnished with the hot-house annuals and plants intended for it. The green-house collections are usually placed in some shady recess, or sheltered situation, or in such order as to shelter and support each other, and where the plants may be seen from a walk, and aggregately show an ornamental character. If near a basin or tank of water, the better, but not under the drip of high trees.

The arrangement and distribution of every ornament of the flower garden is, at this season, a business requiring both thought and action: not only is it necessary to know the names, habit, times of flowering, and colour of the flowers of the numerous trees, shrubs, and herbaceous plants admitted into the flower garden, both within the conservatory or green-house, and out of doors, but also the seasons in which their seeds should be sown, cuttings struck, or the plants otherwise propagated; and also how every one may be advanced or retarded, in order that the garden may be at all times as gay and floriferous as possible. Floriculture, in fact, is a distinct branch of gardening, and as such requires as much botanical and physiological knowledge as any other branch of the calling.

## REMARKS ON THE WEATHER.

SINCE the beginning of the month we have experienced fine seasonable weather, with occasional showers, which proved of great service in gardens as well as in the fields. Vegetation progressed rapidly, especially after the 16th; as for several days previous much soft but soaking rain had fallen, most opportunely for assisting the germination of seed, reinvigorating new planted trees, and freeing old fruit-trees from frost-bitten and defective flowers. On the 15th we had loud claps of thunder, accompanied with hail, which did considerable damage to hot-bed, and hot-house lights, particularly in the parishes of Lambeth and Clapham. This, and the rain together, dislodged many caterpillars from the fruit-trees, and which might be seen suspended by their threads, or creeping on the ground below, where they were eagerly collected by house-sparrows, and other small birds, to feed their young.

Forced peas, and spring-sown turnips, appeared in Covent Garden market on or before the 25th April. And as a proof of the mildness of the past winter, green tares were hawked about London on the 6th May. All the summer birds had arrived on the 15th, except, perhaps, the turtle-dove.

From the present appearance of fruit-trees there is a prospect of a fair sprinkling of all the different sorts, with the exception, perhaps, of standard plums. Wall-fruit, in some places, have suffered greatly from the frosts which happened about the middle of April. The first shoots of vines, in warm aspects, also suffered at the same time; and it is remarkable that, about the same period, the vineyards of France and south of Germany were very much damaged by frost, which killed the leading shoots and fruit so extensively that, in some wine districts, no vintage is expected this year.

Strawberries are finely in flower, and much assisted by the present dripping weather; there is, therefore, every sign of an abundant crop of this delicious fruit.

The larva of the *Yponamenta capella*, or little grey moth, described in our last number, made its appearance on apple-trees and hawthorn hedges about the 15th inst., and already the young shoots are covered with their webs.

Both insects and mildew begin to appear on peach and nectarine trees; picking off the diseased leaves and shoots, and anointing the affected parts with soap-lather and flour of brimstone, is the best remedy.

*London, May 25th.*

# PAXTON'S

## HORTICULTURAL REGISTER,

JULY, 1835.

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### HORTICULTURE.

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#### ON ACCELERATING THE FLOWERING OF PLANTS.

PLANTS resemble animals in many things, and in no one more than in their respective periods of adolescence ; that is, each requires a certain lapse of time between rising from the seed and producing flowers and fruit. Some genera re-produce themselves by seed, at a very early period of their lives ; others require several years before their fructiferous organs are developed.

That the fructiferous organs occupy a central station in every grand division, as well as in every subdivision of a plant, is very obvious. Look at the cauliflower, for instance ; we see here a system of roots, a stem invested with a certain number of leaves, surrounding the head of flowers which is seated on the apex of the stem. When its investment of leaves is developed the head of flowers comes forth, blooms, ripens seed, and then the whole dies. This process of growth obtains in all the plants of the order *Cruciferae* which are culinary and herbaceous ; all these also being biennials, if sown at their natural season, viz. when the seeds are ripe.

That their period of adolescence may be very much shortened, is well known ; this happens in consequence of too early sowing or other mismanagement. If cauliflower seed be sown in the beginning of July, the greater number of seedlings will be so much excited by the warmth at that season that nearly the whole will show flowers before the winter ; but this answers no purpose of the cultivator, because the whole plant is diminutive and useless, the head being so small that it is technically called " a button."

The right management of the cauliflower aims at two concomitant results, *early*, and at the same time *large* flowers. The seed for the principal spring crop is therefore not sowed till after the middle of August, when the nights are lengthening and the growing season on the decline. The young plants then partake of the torpor which seizes all vegetation. In this state they are protected through the winter, and all means used to increase the bulk of the plants in order to have bulky flowers. These means are protection from frost by coverings of hand-glasses or glazed frames, a rich compost of soil to grow in, and liberal supplies of water when necessary. Under this treatment the plants develop themselves slowly but sturdily; and, favoured by the genial advancing season, begin to yield their heads during May and June.

Now, although it be desirable to have cauliflowers as early in the spring season as possible, yet, from the peculiar character of the plant, and of that part of it which is eaten, it cannot be forced to yield *large*, though nothing so easy as to cause it to yield *early* flower-heads, as before observed, either by neglect or design; for, by keeping the plants under glass, too closely crowded together, and in poor and perfectly dry soil, the whole will probably run to flower in March and April. The reason appears to be this—the plant, like all others, is composed of two constitutional principles; the first are the exterior appendages of the flower, the second is the chief essential, the flower itself. These, however closely connected and necessary to each other, are capable of being acted on separately, according as one or other is more or less excited. If the appendages receive rich and moist nourishment, and be placed in a moderate temperature, they become very much amplified, and progress before the fructiferous principle, the latter *pausing*, as it were, to gain lateral bulk; and when the former have gained such a size as will enable them to exercise their functions in perfecting the flowers and seed, then the flower follows of course. But on the other hand, if the appendages be stinted in the requisite supplies of rich food, water, space, fresh air, &c., they are arrested in growth, and the vitality residing more powerfully in the interior than on the exterior of the system, the centrally placed flower receives the whole vigour of the plant, and consequently is prematurely impelled into view.

This appears to be the cause why all the *Brassicæ* tribe of plants are apt to “button” or “run away,” as it is commonly called; and why so few can be forced to yield their thickened stems, as the turnip; their accumulated leaves, as the cabbage; or their flowers, as the plant just described.

But there are other descriptions of plants whose flowering and seed-ing may be accelerated by early sowing and forcing, either by simple

protection or by giving artificial heat. These are annuals, or such plants as require a period of six or seven months to arrive at maturity. Such are the different sorts of corn and pulse ; the first are compound plants, that is, they are not like the cauliflower, supported by one root, producing one stem, but have an aggregation of distinct tufts of roots, each supporting its own stem and fructification. These stems are very simple in structure, and are invested in but a few linear leaves, so that they are quickly produced ; and as the swelling of the grain does not appear to depend on the amplitude or duration of the foliage, it is quickly fugitive.

The different sorts of pulse, viz., common and kidney beans, peas, tares, &c., rise from the seed with one stem, which afterward becomes more or less branched. Their flowers are not terminal, like the cauliflower, but axillary, that is, growing out of the angles formed by the leaves and stem ; consequently the lowest flowers appear first, and the bloom is continued consecutively upward so long as the soil, the situation, or the season favours the extension of the plant. Now here it is to be observed, that the length of stem between the root and the first flower determines not only the earliness of the variety or species, but also the period intervening between seed time and harvest.

From this portion of practical knowledge a practical rule is to be derived, namely, *the earlier we sow the earlier we shall reap*. This rule, however, can only apply to hardy annuals, and perhaps to some few biennials ; for instance, if we sow early frame, or Warwick, or Charlton peas in the month of October, and guard them from the severity of the winter, they will be podded sooner than if sown in any of the spring months, notwithstanding the latter sown crop will grow to greater bulk of straw, and yield a greater quantity of pods. This appears to be such a self-evident result that it may give cause for wonder why it is at all stated. But the reason for the statement is intended to counteract an opinion gravely promulgated, that *bulk* and not *age* gives maturity, or early ripeness ; and hence a rule has been laid down, advising common peas and beans not to be sown till the spring weather has warmed the ground, thus securing rapid growth and earlier podding than if sown in autumn. To practical readers this idea needs no refutation ; nor is it necessary to marshal proofs of its erroneousness, because that part of the stem between the seed and the first flower is slowly though completely developed during winter, and the floriferous part in the spring, so that such plants are in fact one complete stage *in advance* of spring-sown plants.

The advantage of accelerating the fruitfulness of tender culinary vegetables has been ingeniously and successfully put in practice by an

able horticulturist, Mr. Cuthill, of Parson's-green, first communicated to the *Gardeners' Magazine*. This practice consists in obliging (we may say) kidney beans, both dwarfs and runners, to pass their adolescent stage under glass in the spring; and soon as frosts are no longer dreaded, are planted in the open air, when the plants immediately begin to bear. This is really a very useful expedient, as well for market gardeners as others.

The same tact is had recourse to in the culture of melons, cucumbers, and many of our tender annual flowers; that is, compelling them to pass their youth in a preparatory asylum, in order to make them yield their fruit as early in our summer as possible.

From the consideration of herbaceous plants we naturally turn to shrubs and trees; and here the description of the development of the cauliflower, and other similarly constituted herbs, equally applies. The seeds of chestnuts and walnuts are sown; one or more stems rise, and become branched in the air; but they are for some years barren, because the fructiferous organs have not yet thrown off their investment of leaves, with which each is environed in the bosom of each bud. The flowers, therefore, cannot come forth till the stem, branches, and twigs are so far elongated as to unfold the inner coverings of the floral members and allow them to come forth. The same is the case with other fruit trees, when raised from seed. Apple and pear trees, when raised from seed, for the purpose of obtaining new varieties, do not present their flowers till the sixth or seventh year, for so long is their state of adolescence. These trees, however, are seldom propagated in this way, and for two special reasons; because the true character of the sort can very seldom be perpetuated by seed, and because waiting seven years for the fruit is a loss of time. The kinds are therefore increased by budding or grafting, by which means an aged and fructiferous head is obtained in a comparatively short time. Sometimes, indeed, where due precautions are taken, flowers often, and occasionally fruit, are borne on the graft inserted in the same year.

It must be observed, however, that buds always, and grafts most frequently, require a season of barren adolescence, like seedlings; but this proceeds from the luxuriance of growth with which both commence their career when united to a vigorous congenial stock; as it is well known to practical men that both may be made fruitful in a very short time after their union with the stock.

From the foregoing remarks, it will appear that by starving the cauliflower, or any other vigorous growing herb whose flowers are required, the latter may be produced at almost any time before the regular season, were they worth the trouble. And by similar means of



checking the growth of luxuriant growing fruit trees, they may be very early thrown into a bearing state, provided they are in a favourable soil and situation.

A few more particulars respecting the culture and forwarding cauliflowers, peas, &c., might be added here, but these must be taken up at another opportunity.

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#### ON THE CAPRIFICATION OF FIGS.

TO THE EDITOR OF THE HORTICULTURAL REGISTER.

SIR,—At Malta and in Provence the maturation of figs is accelerated by pricking them at the open end with a straw dipped in olive oil, and I have no doubt the practice may be followed with great success in this country. This method may more than probably have originated in the observation of some naturalist, relative to the habits of a peculiar dark-coloured fly, which is much smaller than the common house fly, having, to the best of my recollection, a sharp and narrow head, narrow and flat body, with short wings, and its structure in other respects is admirably calculated to penetrate minute orifices.

This insect undergoes its various changes in the fig of the male tree, which fruit very seldom exceeds in size the largest acorn, when it turns yellow, withers, and falls; about this period the insect emerges or escapes from its dwelling, in its ultimate form, and proceeds in quest of nourishment from the fig of the bearing or female tree, which it enters at the crown or upper end, as it approaches maturation, and in the south of Spain so confidently is the presence of this insect considered necessary, to produce or occasion the highest state of perfection in the fig, that I have seen persons collect and string transversely the figs of the male tree, which they have placed on the upper branches of the bearing tree, for the purpose of more effectually ensuring the operations of this useful fly.

I am of opinion that the fig tree is partly aquatic, for in countries where it is indigenous it will be found growing in the greatest luxuriance, in a light soil, which is either very near water, or often irrigated.

Hijo DE ESPANA.

10th June, 1835.

## OF THE BANYAN TREE OF INDIA.

IN every history of the vegetable productions of India, we are sure to met with a description of the *Ficus Bengalensis*, called in its native country the banyan tree. Some of the specimens in the neighbourhood of Calcutta are of great age and of immense size, and excellently adapted for the convenience of the inhabitants of that warm climate, who spend much of their time in the open air, as well for recreation as while engaged in various occupations. Weavers, tailors, &c., may be seen busy under the necessary and delightful shade of the widely extended canopies of those native trees. The lower branches of this species of fig tree are extended laterally to a great distance from the bole, and would lie upon the ground did they not produce roots from their lower sides, which descending fix themselves in the ground and become stems—

“A pillared shade with echoing walks between.”

As these roots are produced from the lower branches, at pretty regular distances from the butt, and afterwards from each other outwards, they appear to stand in pretty regular ranks of concentric circles round the main stem, and thereby form circular colonnades.

As the side branches are more lengthened out than the central ones rise in height, the tree at half a mile distance appears like a depressed cone (fig. A), and the stranger cannot believe it to be a single tree until he arrives under it and witnesses its complication of stems and branches.



FIG. A.

This species of the fig-tree was introduced into this country so long ago as 1690, and ever since has been treated as a stove plant. It grows strongly, and has a tree-like habit, but confined to a pot, and necessarily diminutive, it seldom exhibits that peculiarity of character by which it is so well known and useful in India. A plant of it, however, kept in the stove of the Chelsea botanic garden, produced from one of its

branches a strong single root, at the height of four feet from the surface of the pot in which it grew, which descended and fixed itself in the soil at about four or five inches from the original stem, to which it has now a similar appearance and function. Before this aërial root reached the soil in the pot, it began to ramify as roots usually do in the ground, some of which ramifications are still on their way downwards, the whole plant appearing as represented at figure B.

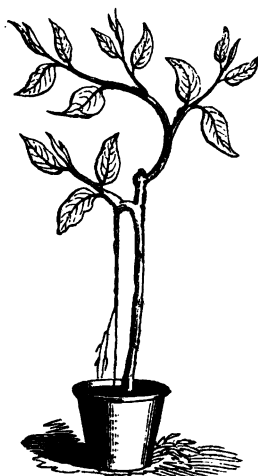


FIG. B.

We have thought well to notice this habit of the tree in question not altogether for its singularity, because we have several plants in cultivation which present the same phenomenon, though not with the same results; the branches of the May Duke cherry, growing in damp and shady situations, will during the summer put forth roots from their under surface, and which would undoubtedly reach and establish themselves in the ground like the fig, were they not killed by the frosts of winter. The common cultivated fig, and very probably all the fig family, present or may be induced to eject roots from any of their branches. The grape vine is also a familiar example, as well as many of the orchideæ.

A practical remark may be introduced here, of which some use may be occasionally made: it is that all shrubs and trees having a tendency to produce roots from their branches, are easier of propagation by cuttings and layers than others which have no such tendency. The Chinese and Italian method of propagating orange and other trees is founded on this property of trees. A ring of bark is taken off that part of a branch

whence roots are wished to be formed ; the wound is covered by a ball of moist earth, kept on by a bandage of some kind or other, and constantly moistened by a leaking vessel of water suspended above the ball of earth. When the latter is filled with fibrous roots, the branch is separated from the mother and potted, or placed where it is to remain.

A vine planted at one end of a wall may by annually layering the lowest side shoots be made to cover the whole in time, and the vineyards in France are occasionally re-stocked with young plants by layering young branches in the vacant spaces between the old roots, which last having become debilitated are afterwards grubbed up.

Roots produced in the air are constitutionally very different from radicles produced in the earth or in water. Both the latter are extremely delicate, and would be almost instantly destroyed by dry air if exposed to it. The former are more robust, hardy, and emit no fibres or spongoles like those in the earth. They descend by a continual protrusion of their central parts, the point ever throwing off and leaving behind the cuticle or bark. These aerial roots are evidently produced by and from the vital membrane of the plant, and certainly not from either the bark or the wood, for neither buds or roots are ever seen to originate in those members after they are once formed.

Many tropical plants produce roots from their stems and branches ; not only the different species of tropical orchises already alluded to, but many of the *Bromeliaceæ*, and particularly the *Pandaneæ*. The greater number of these two orders are ever producing sets of roots from the joints higher and higher up the stem, the older roots as regularly dying off below, so that at last the head is supported by large roots like buttresses ranged around. From this constitutional peculiarity of these plants it is evident that every new extension of the head is furnished with a corresponding set of roots, and this incident allows the practice of an apparently very unnatural manipulation, and which would be positively fatal to the generality of plants ; this is neither more nor less than depriving them of all their old roots, in order to induce a stronger growth of the head. That this is not only a practicable, but in some cases of their culture a necessary proceeding, is well known to practical pine-apple growers, and sufficiently proves that the new growth of the leaves and fruit depends entirely on the new roots which are simultaneously produced.

Propagation by layering is often preferable to any other method. Stone-fruit trees, whether grafted or budded, are sometimes liable to gum at the insertion of the graft or bud, and sometimes defects of the stock are, or may be, conveyed to the graft ; but a healthy well-rooted layer is pure individually as well as true to its kind. We have seen

beautiful young peach trees raised from layers, and no doubt many other fruit trees may be so propagated, which would be very soon fruitful, and consequently of very moderate growth, well fitted, however, for low walls or any limited space where such trees may be required.

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## LANDSCAPE GARDENING.

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### THE LANDSCAPE GARDENER, COMPRISING THE HISTORY AND PRINCIPLES OF TASTEFUL HORTICULTURE.

BY J. DENNIS, B. C. L., PREBENDARY OF THE COLLEGIATE CHURCH OF KENTEN CASTLE;  
AND AUTHOR OF "THE KEY OF THE REGALIA," "ARCHITECTURA SACRA,"  
&c., &c. J. RIDGWAY AND SONS, PICCADILLY, 1835.

LANDSCAPE gardening is now advanced to the rank of one of the fine arts, and placed next to landscape painting. It can only be treated of by those who can wield a classical pen. To infuse the principles of landscape painting into the practice and dispositions of the gardener, has long ago been tried by many eminent writers, but, as it would seem, with but partial success. Either the perceptions of the gardener were too obtuse or the principles of the painter were inapplicable. On this point, different opinions are held; some affirming that the painter's ideas are in every case easily applied, while others assert the contrary. The learned author of the volume before us, embraces the affirmative side of the question, and has written the book to show how such things may be managed so as to produce the very effects which would be approved by the painter, and admired by every beholder. In this he has succeeded as well as any previous writer on the subject; and considering the *impossibility* of transferring fine taste by precepts, the rules which should guide the artist in forming garden scenery are laid down as explicitly and minutely as the subject admits of.

To every one wishing acquaintance with the history and changes of style in landscape gardening, the book will be most useful; and to those wishing to embellish their paternal acres no better directory can be had.

The author expatiates much on the great interest which may be created by a judicious intermixture of various tinted plants in forming ornamental plantations of either trees or flowering shrubs, and shows the great advantage of so disposing them in order to produce striking contrasts, or harmonious associations.

Some of the author's descriptions are highly amusing. In looking

at some lately improved places, he asserts that "It is invariably perceptible by a glance from the eye of taste, whether grounds have been laid out by a mere professional *engineer*, or under the superintendence of an artist or amateur of paintings; the direction of the lines supplying a leading test. The *engineer* commonly wages war with nature, summoning to the field a host of able-bodied mercenaries, armed with spades, crow-bars, or pick-axes, and, like potent pioneers, clearing the way of all impediments to the valorous champion's march, and with mighty arm rearing ramparts, covered ways, terraces, glacis, and multifarious invincible bulwarks. Such work of labour fills the gazing multitude with admiration and astonishment, the complacent conqueror of nature attaining the consummation of his triumphal achievements, the *spolia opima*, golden treasure.

"A man of taste, on the contrary, is content to become the fostering nurse of nature, merely controlling eccentric deviations and checking luxuriant wildness, attentively studying every prominent feature, and delineating every delicate lineament, merely substituting polish for coarseness, chasteness for rudeness. By such judicious treatment, correctness and elegance, beauty and sublimity are generated. But art can no more copy nature in planting, than in painting, without minutely and perseveringly scrutinising every interesting trait in her character, and every constituent principle contributing, whether by combination or contrast, to form her simple outline and complicated detail."

We have quoted the above to show the author's disapprobation of what he facetiously calls modern *engineering*, and also what he considers to be the sole duty of a landscape gardener. And we quite agree with the Rev. writer that, unless a man has seen natural scenery of every description, and is able to appreciate what is really beautiful, picturesque, or sublime, and a practical judge of how far any of those characters are creatable about the place on which he may be employed, is altogether unfit for the profession of landscape gardening. A man may be able to design a very neat place by making smooth gravel walks serpentineing through clumps of beautiful flowers and shrubs, levelling ground, digging sunk fences, and giving the whole of the pleasure ground an air of comfort and high keeping; and yet be totally ignorant of the principles of appropriate combination of the objects he has to arrange, as shown by painters in their works, or as recommended by the author before us.

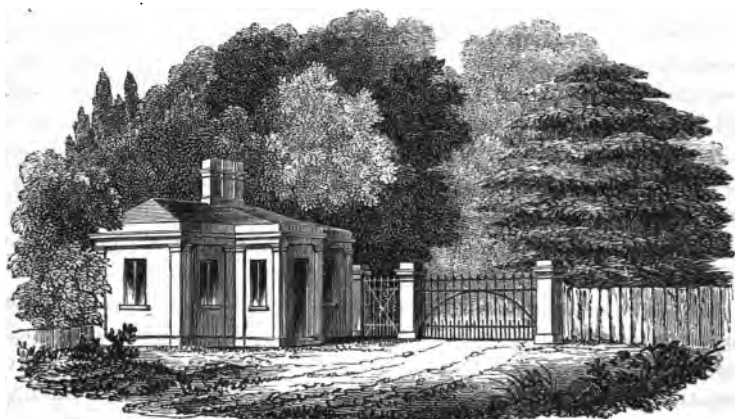
The theory of colours as detailed by the writer is well worth studying; and he refers to two places as examples of ornamental gardening which deserve to be imitated as standards of (almost) perfection. These are Stourhead, and Luscombe, near Dawlish, the seat of Charles

Hoare, Esq. The latter is said to be "the closest copy of natural scenery as yet produced by means of plantation, in any part of the kingdom." The author also speaks in high terms of the late alterations in St. James's Park, which he attributes to Mr. Eyton (Aiton) of Kew ; but gives no opinion how far simply beautiful scenery is suitable for the front of a regal palace situate in the midst of a city. There are many other interesting notices in the book well worth the attention of improvers in general, and landscape gardeners in particular:

*Ed.*

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LETTER I. FROM A. B. TO A FRIEND IN LONDON.



Entrance Gate to Fairfax Hall.

MY DEAR SIR,—Like myself, you have always been an ardent admirer of rural life and rural scenery ; and often have we lamented that our lot was not cast where we could every day enjoy the refreshing aspect of woods, and lawns, and babbling brooks, and sunny banks, and shady dells, instead of being immured in noisy streets, amid "the busy hum of men." From such turmoil you know I have fled away for one short month at least, and only regret we could not fly together. You have, however, imposed a pleasing task upon me, which, as leisure allows, I shall faithfully execute, and give from time to time, as well as I can, some description of the country-seat of my excellent friend, under whose hospitable roof I am to be an inmate during my absence

from town. Part of this exordium you will perceive is embodied in my note to you before leaving London, and I have now to follow it up by the recital of my impressions and feelings during this interesting visit to Fairfax Hall.

No bridegroom was ever more elated on the day of his nuptials than I was when I stepped into the chaise which conveyed me to the Hall. I had heard much of the natural beauties of the place, and of the various improvements which had been begun by the grandfather, and completed by the father of the present proprietor. Some alterations have been made by the latter, but only with the view of perfecting what his forefathers only contemplated would be the result of time.

I have not found that any professional landscape gardener was ever consulted as to the arrangement of the gardens and grounds; but it might happen that as Mason, author of the "English Garden," and several other amateurs of ornamental gardening were frequent visitors at the Hall, hints might be given by those gentlemen, of which the proprietor would avail himself. Luckily, the former possessors were men of refined taste, and which being inherited in a high degree by my friend, the present owner, there is little left for him to do save the preservation of the original dispositions.

It was on this 30th of May, and about 4 P.M., I first caught a view of the woods which surround and diversify the park of Fairfax Hall. The latter appeared to occupy higher ground than that over which I was travelling: the park paling was here and there visible to the left, through scattered tufts of forest trees and bushes on a portion of unclosed common on the outside of the park. The turnpike-road seemed at a quarter of a mile distance from the principal entrance (which at the moment struck the eye), as if it led directly through the park; because the gates were erected across the right line of the road on which I was advancing; but at the distance of about two hundred yards from the gates the high road trended away through a vista to the right, and disappeared in the woods which extended far in the same direction. Through the vista, however, I just caught a glimpse of the church spire of the next post town, at the distance of four or five miles off.

The entrance is embosomed in wood; neither the porter's lodge nor gates are extravagantly splendid. The former is a plain, substantial, Grecian dwelling; the latter well-designed iron palisade foot passengers' and carriage gates, between massive stone piers. The lodge is roomy, and fitted up with every convenience for one of the under gardeners and his family: it is flanked by its little garden, in which, besides common vegetables, there are evergreen shrubs and flowers,



among which rose a fine purple-leaved beech. This, together with a fine cedar of Lebanon which stood opposite the lodge, stretching its horizontal arms across the entrance, told me at once I had entered upon dressed ground ; and the architectural character of the lodge as plainly told me what description of mansion I was about to enter.

From the gate the smooth and firm carriage road passed through a dense and lofty grove of forest trees, whose boundaries on neither side were discernible, imparting an idea of confinement in some degree painful to a stranger who was eagerly staring about him in every direction. While in this irksome suspense the carriage suddenly emerged from the deep shade of the wood into open day—a most beautiful prospect lay before me—I called to the post-boy to stop. Leaping from the chaise I was enraptured with the varied scene ! rich masses of wood hung, as it were, upon the slopes of a beautiful valley, which, commencing at and retiring from the brow on which I stood, widening as it receded, and winding round a promontory on the right, was lost to the view. A little way back on this promontory the south-east angle and part of the south portico of the house was visible at the distance of half a mile ; and beyond the point of the promontory, and in the lowest dip of the valley, an expanse of water reflected the golden light of the western sun ; and which at the same time illuminating the fresh green outline of every budding and intervening tree, while their boles were in deep shadow, presented altogether a landscape which the most fastidious eye would have paused to admire.

Full of the pleasing ideas which this foretaste of the place had given, I again took my seat in the chaise, and proceeded onwards. The line of the approach trended rather to the right in an easy sweep, but as far as it could be seen in advance, always seemed to point to the spot where the visiter conceived the house to stand ; passing through open groves, or across winding glades which allowed pleasing peeps down into the valley on the left, or towards a well-wooded country on the right hand. Sometimes passing through a herd of deer, which wheeling gazed at us as we ran along ; or threading a flock of South-down sheep which were scattered over the lawn. These different objects and views I shall describe more minutely in another letter, as, passing so rapidly along, I then had but time to note them in memory.

At last, after passing through a succession of fine scenery along a well-designed and easy carriage road, I spied through an opening of the trees before me an ornamented turret with its gilded ball and vane, which I afterward found to be that of the stable-yard clock. This was a beacon announcing my near approach to the mansion ; and so it proved, as, on passing through a thicket of lofty trees and holly under-

wood, the chaise entered under a semicircular arch into a spacious court surrounded by offices, and stopped at the steps of the back portico of the house.

Alighting here, I was ushered through a lobby, across a splendid hall, and into the drawing-room, where I was received with all that urbanity and kind-heartedness so characteristic of my excellent friend and his amiable family. Salutations over, and every inquiry which sincere friendship and gratitude mutually asked and answered, I was irresistibly drawn to the windows to gain a more comprehensive idea of the park and surrounding country. My first impressions soon after entering the former, awakened the most intense curiosity to have a bird's-eye view of the whole; and the manner I was conducted to the house did not at all tend to satisfy, but rather to increase that curiosity. I had approached by a kind of "covered way;" and when I looked from the windows scenery of the most enchanting description met my view, and far exceeded the anticipations I had previously felt.

At this moment, it is true, my personal sensations were of the most agreeable description; I had escaped from the noise and smoke of London, was at home among kind and intelligent friends, and beholding some of the finest combinations of undulating land, enriched and diversified by noble masses of woods and scattered groups of trees, animated by herds and flocks, and moreover brightened by vivid reflections from an unruffled lake, all partially lit up by the mellow rays of a setting sun; the whole, I say, produced such an effect on my perceptions as I hardly ever was conscious of before.

It is impossible, however, to convey to you, my dear Sir, the delight I experienced in viewing this charming place; and as you can gain but little from general observations, I propose to describe all the greater features in detail for your gratification; and as my friend here can furnish me with his methods of proceeding in producing the "effect" originally intended by the first improvers of the estate, my letters will not be wholly uninteresting.

I shall close this first letter with one observation only, which, as it occurred to me while looking from the windows, I mention now, lest I forget it altogether. I dare say you must have felt as I have almost always done in viewing what may be called pastoral landscape paintings, especially of the Italian and French schools, that they all convey an idea of what is significantly called *repose*. So much does this feeling prevail that, repose (meaning, I presume, harmony of tinting) is one of the characteristics of a good painting. Now, in the necessary absence of all motion and sound, from paintings, and from the quiet stillness of a picture gallery, I have often queried whether the quiet of

our perceptions, while viewing pictures, has not been erroneously attributed to the noiseless dispositions on the canvas. Be this as it may, I am quite certain that I felt the same kind of sensation while viewing the scenery here a little after sun-set, when all was calm and serene save the distant bleating of lambs or the tinkling sheep-bell.

Your's ever faithfully,

A. B.

30th May, 1835.

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## FLORICULTURE.

### ON THE CULTURE OF THE CARNATION.

BY G. J. DALE, WIKSWORTH, DERBYSHIRE.

A MORE fragrant and beautiful flower does not exist than the carnation. I am decidedly of opinion that this plant is a native of England, though the old original flower, the clove, seems almost, if not altogether, extinct. The late Sir Joseph Banks offered a premium of 10*l.* to any one who would produce it. A number of our new sorts have been brought from Germany and Holland, where they are cultivated to great perfection; also from Italy, where they are a favourite flower in all gardens. We have now upwards of 600 good sorts, for many of which we are indebted to florists of our own country.

The compost I should recommend for growing the carnation would be the following: in the summer collect a quantity of fine turf-soil from the hedge sides; or, what is still better, if you can procure it, the soil from rocks which has been a series of years depositing; of this soil I should recommend one half, one fourth river sand, or the light sandy soil you may procure from under the roots of trees by brook sides, and one fourth horse-dung, let this be laid together and frequently turned during the year. When you make your bed up in the spring, after having marked out the size, take out the soil to the depth of twelve inches, put in four inches of good dung, then proceed to riddle in your compost, mixing with it a portion of leaf soil. Let your plants be set twelve inches apart.

I have a decided objection to planting carnations in pots unless these be very large; as to growing them good, bold flowers, which ought to be the object, they require more nourishment than many are aware of. In dry weather give them water every other day. In August the plants will be in full flower, when they must be shaded from the heat of the sun and from rain, as one drop of rain will often spoil the most beautiful flower.

The usual mode of propagating the carnation is by layers, though I have one now which will not strike from layers. This plant, which is the most splendid flower I should say yet produced, is a yellow ground crimson Bizarre, which I intend when in full bloom to have painted, and shall be glad to send it to the proprietors of this magazine, being a flower which will be the admiration of florists. There are at present only about a dozen layers of it, which, in October, the person from whom I procured mine will have a few to dispose of at 10s. 6d. per plant.

Various times have been stated for layering, but the growers of carnations may take this for granted, the most proper time is as soon as they are ready.—I have several growing well, which were layered in the middle of May. I should recommend them to be taken off about the latter end of September, and potted singly in the compost, as above stated, and placed in a shed\* protected from the cold winds; but I should say, do not, on any account, put them under glass. Many recommend a frame, but, for my own part, I totally disapprove of it. These simple directions, if followed, I have no doubt will answer all the expectations of the growers of this beautiful flower.

June 2nd, 1835.

[The drawing will be received with thanks and published on a plate in this work. Ed.]

## BOTANY.

### ON THE STUDY OF THE SCIENCE OF BOTANY.

BY F. F. ASHFORD.

(Continued from p. 229.)

#### Classis XII.—ICOSANDRIA.

*Icosandria*, from *ico*, twenty, *anēr*, a man. Bisexual flowers, furnished with many stamens or male organs of generation.

To gardeners this is one of the most interesting of all the Linnaean classes, containing a greater proportion than any other of objects which come within their observation and management. It also consists of genera for the most part nearly allied, and comprises not only the most remarkable portion of *Picodeæ*, all *Cacti*, and the chief of the *Myrtaceæ*, but almost every genus of the beautiful and hardy tribes of *Rosaceæ*.

The characters of this class are well defined, and entirely depend upon the insertion of a number of distinct stamens, above twenty, into the inner surface of the calyx. (See Classis XIII.)



\* Covered stage. Ed.

This class contains the clove (*Caryophyllus aromaticus*), pomegranate (*Punica nana*), almond (*Amygdalus communis*), peach (*A. Persica*), nectarine (*A. Persica nectarina*), cherry (*Prunus cerasus*), plum (*P. domesticus*), medlar (*Mespilus Germanica*), apple (*Pyrus malus*), pear (*P. communis*), quince (*Cydonia vulgaris*), and apricot (*Prunus Armeniaca*). Orders three, viz.

*Monogynia* ; *Prunus mahaleb*.

*Di-Pentagynia* ; from two to five styles inclusive ; *Gillenia trifoliata*.

*Polygynia* ; *Rubus rosæfolia*.

### Classis XIII.—POLYANDRIA.

*Polyandria*, from *poly*, many, and *anēr*, a man. This class agrees with the last in having bisexual flowers, with an indefinite number of stamens, which neither cohere in any part of their

length, nor are distributed in distinct parcels ; but it is distinguished by the stamens being inserted distinctly from the floral envelopes, immediately under the ovarium, in what has been called the receptacle by Linnæus and his followers, *torus* by Salisbury, and *thalamus* by other botanists.



This class consists of the greater part of several extensive orders such as *Ranunculaceæ*, *Magnoliaceæ*, and *Cistineæ*, &c., and, like the last, is replete with subjects of interest to gardeners and florists. The various kinds of *Clematis* form the most valuable portion of the hardy climbing plants of the verandah. The brilliant varieties of the ranunculus and anemone constitute the most attractive part of the flower-garden. *Pæonia*, well known for the richness of its colour, is the ornament of every pleasure-ground ; and the noble varieties of *Magnolia*, the pride of the North American forest, are the finest exotics of the shrubbery. *Anona*, or the custard-apple, is one of the most important of the fruit-trees of tropical countries ; and the celebrated water-vine of Sierra Leone is a species of *Tetracera*. Nor must *Sarracenia*, with its curious pitcher-like leaves ; *Papaver*, from which opium is extracted ; *Cimicifuga*, whence is obtained the antidote to the dangerous bite of the rattle-snake ; *Bixa*, or the annotta tree, from the fruit of which the colouring matter for the red cheese of England

is procured; nor *Hepatica*, with its modest beauties, be omitted. Orders five, viz.

*Monogynia*; *Capparis spinosa*.

*Digynia*; *Bauera humilis*.

*Trigynia*; *Hibbertia dentata*.

*Pentagynia*; *Aquilegia vulgaris*.

*Polygynia*; *Liriodendron tulipifera*, tulip tree.

#### Classis XIV.—DIDYNAMIA.

*Didynamia*, from *dis*, twice, *dyo*, two, and *nema*, a filament; meaning that this class bears bisexual flowers, furnished with four stamina, two long and two short. (See Classis IV.)

As the flowers of this class have a particular structure, there are general characters which will nearly serve for the whole, and these I shall give at length, for the further information of the young botanical researcher.



1. *Calyx*; a perianthium, monophyllous, erect, tuberosc, quinquefid, with segments for the most part unequal and persisting.

2. *Corolla* monopetalous and erect, the base of which contains the honey, and does the office of nectarium; the upper lip straight, the lower spreading and trifid; the middle segment the broadest.

3. *Stamina*, four filaments subulate, inserted into the tube of the corolla, and inclined towards the back thereof; the two inner and nearest the shortest; all of them parallel, and rarely exceeding the length of the corolla. The *anthera* lodged under the upper lip of the corolla in pairs, in each of which respectively the two anthera approach each other.

4. *Pistillum*. The germ commonly above the receptacle; the style single, filiform, bent in the same manner as the filaments, usually placed within them a little, exceeding them in length, and slightly curved towards the summit. Stigma emarginate.

5. *Pericarpium* either wanting, as in the first, or, if present, bilocular, as in the second order.

6. *Seeds*; if no pericarpium, four, lodged within the hollow of the calyx, as in a capsule; but, if there be a pericarpium, more numerous, and fastened to a receptacle placed in the middle of the pericarpium.

This class is, with the exception of *Syngenesia* and *Gynandria*, the most natural and best-defined of all Linnæus's great groups, or, as he names them, classes.

The first order contains, for the kitchen or laboratory, rosemary, hyssop, balm, thyme, mint, and marjoram; and for the flower-garden, the various species of *Dracocephalum*, *Phlomis*, *Lavendula*, &c.

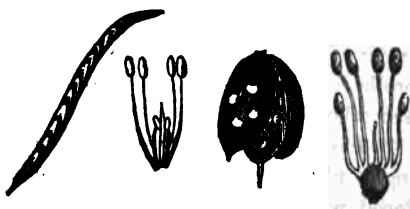
The second order contains a considerable portion of *Acanthaceæ*, containing many genera of much beauty, but few of interest as useful plants. Among the ornamental families every one will recognise the *Bignonia*, with its elegant orange or yellow trumpet-flowers, and frequently twining stem; the *Jacaranda*, with its fern-like umbrageous foliage and magnificent diadem of blue; the *Acanthus*, consecrated to sculpture; the noble *Clerodendron*, the pride of the Japanese; and the modest eye-brights of our English meadows. In one part of the class we have the *Vervain* surrounded by its mystic moonlight charms; in another, the *Antirrhinum* tribe, remarkable for the grotesque resemblance of its blossoms to the snouts of animals; and close behind it imperial *Pedicularis*, proudly rearing her heraldic honours among the snows and deserts of the frozen north. Orders two, viz.

*Gymnospermia*, from *gymnos*, naked, and *sperma*, seed; having the seeds placed in the bottom of the calyx without any other covering, and generally four; *Teucrium marum*.

*Angiospermia*, from *angeion*, a vessel, and *sperma*, seed; seeds several, inclosed in an undivided pericarpium; *Gesneria bulbosa*.

#### Classis XV.—TETRADYNAMIA.

*Tetradynamia*, derived from *tetra*, four, *dyo*, two, and *nema*, a filament; meaning that this class is furnished with six stamens, or male organs, four of which are long and two short. (See Classis VI.)



This class consists, with the exception of *Cleome*, entirely of the natural order *Cruciferae*, and has lately been the subject of the most acute and successful investigation of many botanists of celebrity.

The plants of this class have always been celebrated for their antiscorbutic qualities. These seem to reside in an acrid, oily, volatile

principle, not yet determined by chemists, and varying in the degree of abundance in which it is found in different species. It is particularly abundant in the seeds of mustard and garden rocket, in the roots of horse-radish, and in the foliage of the *Lepidium latifolium*, which, administered inwardly, acts powerfully upon the gastric organs, or, applied outwardly, inflames the skin, and operates nearly as severely as blisters.

Cruciferous plants are chiefly natives of temperate climes, those which are found within the tropics being, in all cases, mountain plants, and are nearly all cultivated in the open air; they are mostly found in open sandy plains, some on the tops of the highest mountains, at the utmost limits of vegetation. Nearly 1000 species are now described, of which not more than twenty-two are to be found in the works of Hippocrates, Theophrastes, Dioscorides, or Pliny.

The flowers of this class are of a particular structure, answering to the following characters:—

**Calyx.** A perianthium, tetraphyllous and oblong, the leaves of which are ovate-oblong, concave, obtuse, conniving, gibbous downwards at the base; the opposite ones equal and deciduous. Within the calyx of these flowers is a nectarium, which is the reason of the base being gibbous.

**Corolla.** Called cruciform; four equal petals; the claws plano-subulate, erect, somewhat longer than the calyx. The limb plain; the laminae widening outwards, obtuse, the sides hardly touching one another. The insertion of the petals is in the same circle with the stamina.

**Stamina.** The filaments six, and subulate, of which two that are opposite are of the length of the calyx; the other four somewhat longer, but not so long as the corolla. The anthera oblong, acuminate, thicker at the base, erect, and with their tops leaning outwards. There is a nectariferous glandule, which, in the different genera, has various appearances; it is seated close to the stamina, and particularly to the two shorter ones, to whose base it is fastened; and these have a slight curvature to prevent their pressing upon it, whereby those filaments become shorter than the rest.

**Pistillum.** The germen above the receptacle increasing daily in height. The style either of the length of the longer stamina or wanting. The stigma obtuse.

**Pericarpium.** A siliqua of two valves, often bilocular, opening from the base to the top of the dissepiment, and projecting at the top beyond the valves, the prominent part of these having before served as a style.



Seeds roundish, inclining downwards, and alternately placed into the dissepiment. Orders two, viz.

*Siliculosa*; comprehending such plants whose pericarpium is a silicula.

*Siliquosa*; comprehending such plants whose pericarpium is a siliqua. (See H. R. vol. ii. p. 168.)

(*To be continued.*)

## ON THAT BRANCH OF BOTANY CALLED MORPHOLOGY.

TO THE EDITOR OF THE HORTICULTURAL REGISTER.

SIR,—The science of botany has received many improvements and additions, within these last twenty or thirty years; and it appears, the more closely it is studied, clearer views of the organisation and elements of plants are acquired, and, consequently, systematic as well as physiological botany is becoming better understood and more generally known.

One of the newest, as well as one of the most puzzling branches of the science is called Morphology, or the metamorphosis of plants. Not that different plants can be changed or transformed into each other, but that their different organs are transformable into each other, that is, leaves are always transformed into involucrums, bractes, hybernacles, calyx, petals, stamens, seed-vessels, seeds and fruit; and moreover, if any of these be first formed, they may, under certain circumstances, be changed back to their normal, or most natural state. By the bye, it is difficult to say which is, or which is not, the normal state; because as they may be either one or other, that is, either common leaves or petals, or pistils, and are either of these as circumstances rule, it is impossible to say which is their natural state.

That there are many instances of what are called floral members being changed into leaf-like expansions is well known; and there are a few instances among highly cultivated plants, which show a disposition of some of the upper leaves assuming a petal-like form and colour; as is sometimes observed on the stem leaf of a tulip. These instances are, however, very rare, and certainly cannot be called a normal development of the plant.

This doctrine was first suggested, it is said, by the celebrated Linnæus; and after being neglected for many years has lately been strenuously embraced by a few eminent botanists, whose concurrence has

lent a value, and given a reality to what was considered formerly as only a visionary dream. The converts to the doctrine affirm that every organ or distinct part of a plant is formed of the same elementary matter. This is undeniable ; but, it is added, that none of the organs have what is called normal existence, but are indifferently one or other, according as external circumstances affect them. Thus, if a tree grows luxuriantly, the elementary membranes are extended into shoots and leaves ; but if the growth be slow and feeble, the membranes are expanded into flowers and fruit, thus virtually denying that the fructiferous organs have any identity in the system.

It has often been asserted that, animals and vegetables have in many particulars great resemblance to each other, and in nothing more than in their organic sexuality. The notions of the morphologists, however, destroys this similitude ; in the first, they must know that these essential organs are always present ; but in the second, they suppose them to be only accidental. A free growing tree contains no fructiferous organs in its structure ; according to this new doctrine it only contains the common vegetable element of which the flowers and fruit are formed. A flower, therefore, is "only a stunted branch," and, "therefore, all theories of structure inconsistent with these propositions must of necessity be vicious."

I have thrown these observations together in the hope that yourself or some one of your readers will enlighten us who have not seen all the books in which this curious doctrine has been treated in detail. Perhaps the discussion may elicit something that may be useful as well as satisfactory to practical men.

QUERIST.

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### MISCELLANEOUS INTELLIGENCE.

AMONG the many improvements invented for forcing or preserving exotic plants by means of heat evolved from some kind of fuel or fermentive matter, are those simple coverings which defend from frost only. These expedients have been alluded to in a late number of this periodical, and therefore have only to notice here that the manufacture of nets for garden purposes, viz. defending fruit trees from frost or birds, is brought to the greatest perfection by means of machinery ; and, of course, on very reasonable terms. It also appears that they may be made to order, and probably of any desired material.—Orders are received at town and country seed-shops.

*To the Editor of the Horticultural Register.*

SIR,—I beg to trouble you with a few remarks on the contents of your number for June. Some of the papers I feel inclined to commend, but they are not all of equal merit nor free from errors, which I am surprised should have escaped your own eye.

Mr. Mallet's paper on "Arbours" is certainly well written as far as it is descriptive, but it is sadly defective in the choice of plants which he recommends for such ornamental structures. Who would have expected to have seen any of the *Rhus* family recommended for an arbour? Is the writer ignorant that the whole genus is more or less frightfully poisonous, inasmuch that labourers whose duty it is to prune or propagate these plants must have their hands protected by thick gloves, lest they should be blistered by the poisonous juice? To children such plants would be particularly dangerous.

Neither do I approve of the *Smilax* being employed about an arbour; it has too hostile a character for such a place. Nor do I think the *Clematis vitalba* should be admitted to the exclusion of the *C. flammula* with its varieties, and the *C. crispa*, *cirrhusa*, &c., all hardy, and some of them highly fragrant. Instead of such very suitable climbers as the *Glycine* [*Wistaria*] *sinensis* and other plants of like character, we have a long list of roses, and among them *Passiflora edulis* and *alata*, both stove plants. Such mistakes (no doubt unintentional) destroy the object the writer intends to advance, and detract from his otherwise amusing article.

I shall next take the liberty to advert to the subject of another writer, who fills your pages without enriching your work—I mean the Linnæan system of botany by F. F. Ashford. I know nothing personally of the writer, but I consider his labours on this head superfluous. Have we not Lee's and Smith's introductions to botany, books of far greater authority and far more explicit for acquiring a knowledge of the science than any of the *thousand and one* new works of the same kind lately emitted from the press? The natural system by Jussieu, with all its learned terminations and hard names, is an actual incubus on the far more intelligent system of the venerated Swede, and it really is a pity that your own or any other periodical should be disfigured by the admission of any of its terms, its new divisions and subdivisions, which distract rather than enlighten the student or young lover of plants, and which has, moreover, disturbed the old nomenclature so much that but few plants are now known by their old names.

Meaning nothing disrespectful to your correspondents or to yourself by the above remarks, I remain

A CONSTANT READER.

We have given the spirit of our correspondent's criticism in accordance with our design of admitting every species of fair remonstrance or remark which may be made on any communication appearing in the Register, but we must beg leave to add that Mr. Ashford does not write for the instruction of old Linnæan botanists, but for our very young readers, who perhaps never saw or never heard of such books as either Lee's or Smith's introductions to botany, the former of which we should think is now out of print. The reception of the natural system in this as in other countries is only a proof of its superiority over that of Linnæus; and though the latter may be long used as *first steps* to the science, it will probably at last be entirely neglected.—Ed.

**MODE OF CONVEYING SEEDS OF ARAUCARIA IMBRICATA IN A VEGETATING STATE FROM CHILI TO LONDON\*.**—On the 17th of July one hundred seeds of the above plant were deposited in a common wine-box by Capt. T. M. Bagnold, R.M., placing alternate layers of earth and seeds. The box was placed in a small cabin which he occupied in a brig of 150 tons; the box had no lid, and served as a stand for a trunk, which was occasionally removed to inspect the box. In crossing the equator several plants were observed rising through the upper stratum of mould, and on arriving in London, Nov. 7, the box was placed at the gardens of the Horticultural Society, when all were found in a state of vegetation, and were placed out in pots. By this plan it is in the power of a passenger in the smallest vessel to import any quantity of these embryo plants, under difficulties hitherto deemed insuperable. In twelve months after their arrival these plants were thought worth three pounds each.

(See p. 3 of the same.) A proposed improvement in draining by the use of the present materials, brushwood, broom, gorse, or heath, but *previously charred*. Peat is also considered peculiarly applicable either for filling drains or making hollow ones, *also charred*. The large silver medal was voted to Mr. T. Johnstone, of Glasgow, for the same.

(See p. 22 of the same.) **EFFECT PRODUCED ON POTATOES BY IMMERSION IN AMMONIACAL WATER OR IN BRINE.**—If potatoes be

\* The *Araucaria imbricata* is a coniferous tree, a native of Chili, where it grows at the foot of the Andes, and attains a height of from 120 to 150 feet or more. The cones contain seeds as large as almonds, and of much the same kind of taste, which are employed by the inhabitants in various kinds of cookery. See letter from Capt. Bagnold in Transactions of the Society for Encouragement of Arts, Manufactures, and Commerce, Session of 1833 and 1834, Part 1, Vol. I., p. 6. The large silver medal was voted to him.

immersed for four or five days in ammoniated water, containing an ounce of the common liquor ammoniæ to a pint of water, they will on removal be found to have their vegetative principle destroyed or greatly checked, so that they may be preserved throughout the year without deteriorating their general qualities. The temporary action of the ammonia in no way affects the potato beyond destroying its power of growth; if however any change is produced, it is rather beneficial than otherwise, somewhat improving the appearance and flavour of inferior potatoes, and giving them a mealiness they did not possess; not a trace remains behind, nor could the most fastidious ever detect that the potatoes had been immersed in ammonia.

The exportation of potatoes to foreign climates, chiefly within the tropics, is an object of importance, particularly for the comfort of sailors; nothing in the way of diet is a greater luxury than a potato with their salt food. The expense of immersion is very trifling, and the potatoes subsequently require to be spread in an airy situation to dry. There is another effect produced by the continued immersion of the potatoes in the ammoniacal water, viz. a consolidation of the starch and fibre, and the loss of the water of the potato. If instead of removal in five days, the potatoes be continued three weeks in the ammoniacal water, they become tough and shrivelled, and on being removed and dried by exposure to the air, assume a new form; the potato appears consolidated and the qualities are greatly lost, for on boiling it assumes the appearance of sago or starch, yet still firm and retaining its form. But if used in its dry and uncooked state it has a mealy flavour and the properties of corn. No chemical change is effected, but merely a mechanical consolidation and extraction of moisture, for precisely the same effect is produced by immersing potatoes in strong solution of salt and water, taking great care to remove by washing the whole of the salt, and this requires some time and repeated changes of water. This mode is cheap, within the reach of every one, and may perhaps be found applicable to the conversion of refuse potatoes into food for cattle or pigs, being sweet, good, and wholesome, and very nutritious dry diet. The hydrate of potato starch forms a very tolerable tapioca for puddings; potato starch mixed with a little lime and boiled produces a very hard, tough, semi-transparent mass, tasteless, insoluble, and possessing the properties of a strong paste and useful cement. (Abridged and compressed from a paper in Part I, Vol. I., of the Transactions of the Society for Encouragement of Arts, &c., by Mr. W. H. B. Webster, of Ipswich, for which the thanks of the society were voted to him.)

The same book contains an account of the Mexican mode of drying plantains, with suggestions for making this an article of colonial com-

merce, for which the silver medal was voted to Capt. J. N. Colquhoun, R. Art., and a premium is now offered by the society for the best sample (see List of Premiums to be had gratis at the society's house in the Adelphi); letter from Mr. Johnstone on the cultivation and uses of the red fig banana, as applicable to commerce; and a paper on Brazilian plat adapted to split straw for hats and bonnets, by Mr. T. B. Smith, of St. Albans, for which he received the large silver medal.

The "Transactions" are sold to the public at the society's house; it is believed that members receive them gratis. They have also the privilege of introducing their friends between ten and two, Sundays and Wednesdays excepted, to view the models, machines, samples, &c., for which premiums have been given.

In one of the most amusing and respectable provincial periodicals, viz. *THE ANALYST*, published by Simpkin and Marshall, London, there appears in a late number a paper *On the progressive Development of the Vegetable Organisation, being the substance of a Lecture delivered before the Members of the Worcestershire Natural History Society*\*, in which there is much interesting descriptive matter, well worthy the attention of all vegetable physiologists, indeed of every one engaged in the culture and management of plants.

The lecturer commences with the Linnæan axiom, viz. that "*minerals grow, vegetables grow and live, and animals grow, live, and think*," and which was intended by its author "to illustrate the difference existing in the objects of the three great divisions of nature,—the animal, the vegetable, and the mineral kingdoms," and may perhaps, for all ordinary purposes, serve to distinguish a sufficient distinction; but when we come to scrutinise more closely into nature, when we proceed to investigate her as displayed in the more simple and elementary of her productions, in those productions which we are accustomed to consider as the lowest in the scale of being, and often to neglect as scarcely worthy of our regard, we shall find ample reason to doubt the correctness of the generalisation. Many mineral substances, when crushed into fragments, afford minute globular particles, which if thrown into water and viewed under high magnifying powers are seen to gyrate and revolve in a manner highly curious, and at the same time present an appearance and habitude, or mode of action, so entirely similar to some forms of animal or vegetable being under like circumstances, as to be altogether undistinguishable by any of the means of investigation which are at present under our command. That there is a difference between the

\* By Robert J. N. Streeten, M.D.

ultimate molecules, or atoms of mineral or inorganic matter, and the simplest forms of animal and vegetable existence, we cannot doubt ; but as we are incapable with the aid of the instruments which we at present possess of tracing out and examining these elementary bodies, either in the one case or the other, we must be content to take our departure in this investigation from that part of the scale of progressive development of which our means of research, aided by our reflecting powers, permit us to acquire a knowledge.

The ultimate particles or molecules of all mineral bodies have been conceived to be of a shape either perfectly spherical, or more or less inclining to a sphere, and these spheres or spheroids of most inconceivable minuteness, varying however in their size in bodies of a different nature, and probably also in their polarities or modes of attraction. In the simplest forms of vegetable or animal existence with which we are acquainted, the external configuration of the organic particles is the same as, or at least very similar to, that conceived to belong to the mineral molecules, namely, spherical or spheroidal. But there is this essential difference : the phenomena of the mineral molecules are best explained upon the supposition that they are homogeneous, or of like nature throughout, whereas, as far as our researches go, the ultimate forms of organisation are not homogeneous, but consist of a membranous or filmy envelope of extreme tenuity, inclosing within its cavity a transparent fluid, constituting in fact a close spheroidal cell or vesicle.

It is not necessary for our present purpose to attempt to define the difference between the simple monads of animal and the simple vesicles of vegetable existence ; and when it is stated that of the former five hundred millions have been crowded into the space of one cubic inch without apparently interfering with each other, and that of the latter still greater numbers have been observed to occupy the same space, it will be seen that the very minuteness of these bodies in itself opposes a barrier to our investigations, the bounds of which we cannot pass. The subject which more immediately demands our attention is the gradual development of the mysterious principle of life, as shown in the variations of organic structure throughout the scale of vegetable being, commencing with the most simple vesicle or germ of vegetable existence, and tracing the increasing development of the vegetable structure till we arrive at the most complex and elaborate of its forms.

The most simple forms of vegetable existence, according to the views here expressed, of which we can form a conception is a close cell or vesicle, a simple vesicle consisting of a membranous film of extreme tenuity, enveloping and enclosing within its central cavity some fluid, or perhaps aeriform matter. Such a vesicle may be observed in the

granules of the *Lepraria viridis*, that green powdery incrustation which is found in such abundance on trees, old posts or rails, walls, &c., in damp shady situations. This green crust is in fact one of the most simple forms of vegetable being with which we are acquainted, and when examined with the aid of a powerful microscope, will be found to consist of innumerable small granules of a spherical shape, very loosely connected together in fours. That these granules are vesicular is evident, for by touching them with the point of a small needle, when viewed in water under the microscope, their filmy coats will be ruptured, and will be observed to present irregular torn edges.

It is not meant to be asserted that these granules, cells, or vesicles are perfectly simple—that they are the ultimate organic elements of the plant; for it is not at all probable that we should here have arrived at the real elementary composition. On the contrary, there is much reason to believe that the external filmy coating of these filmy vesicles, though of such extreme tenuity, is itself compounded of numerous other cells,—that it, in fact, consists of a congeries of vesicles of inconceivable minuteness so united together as to form a continuous surface; each of which secondary vesicles, as they may be termed, may possibly also be compounded in like manner, and so on to an extent which it is utterly beyond our powers to comprehend. To the limits of minute division in the works of the Great Creator, there appears no bound. Were it not that all the parts of His creation clearly prove that magnitude and number present no restraint to his operations—that the vast and the minute are equally the object of his attention—we should often be tempted to throw aside many of the sublime truths of natural science as the wild reveries of a heated imagination. But every department of scientific research leads to the same conclusions, overwhelming as they are to the powers of the human intellect, and every mode of investigation teaches the same results; and while we make the vain attempt to conceive the wonders of creation, we can only pause and admire when the faint glimmering perception, which alone we are able to obtain, arises in our minds.

But to proceed, without entering further into a question which is quite beyond our powers, this green powdery crust in its elementary composition—elementary, as it appears to our eyes, may represent what is to us the ultimate forms of vegetable organisation. A simple vesicle connected in this instance with similar vesicles by quaternary arrangement; in others, as in some of the *Conservæ* and various plants of the *Algæ* tribes, by a binary, ternary, or linear mode of arrangement.

If a number of these elementary vesicles be so arranged in simple contact as to take up the smallest possible space, a section of them will



present the appearance of a series of circles, or if subjected to a certain degree of equable pressure, they will form a kind of net work, pentagonal, hexagonal, or otherwise, according to the presence of various modifying circumstances.

In thus regarding the arrangement of the ultimate vesicles of the vegetable organisation to form the cellular structure of plants, we must not confine our attention to the mere mechanical principles of juxtaposition and pressure. Each organic vesicle, in a state of activity, is endowed, either in itself, or as appertaining to the vegetable structure of which it forms a part, with the principle of life. It may, therefore, increase in substance and expand in size; and from this gradual expansion or growth, certain changes in its development and in its apparent structure will necessarily take place. Thus, by the gradual expansion of a simple vesicle, it will attain to a larger size, its shape may become elongated or depressed, according to the circumstances of pressure under which the expansion takes place, the outer filmy covering or envelope may increase in thickness, and the secondary vesicles of which this film consists become so far developed as to be sensible to our modes of investigation,—and lastly, the organic molecule may acquire the property of reproduction [division] and by the formation [inflation] of other vesicles from the inner [or outer] surface of its filmy covering, or, more probably, by the development of the pre-existing particles of which this covering is composed, the vesicle, which was either simple, or to our senses apparently so, becomes compound, having its central [or exterior] portion occupied by other and secondary vesicles. That these are not merely speculations, has been fully established by the researches of M. Raspail upon the minute chemistry of organic products\*. In examining the granules, or vesicles of fecula, a vegetable product of great importance, and of which the seeds and roots of many plants almost entirely consist, he observed that, subjected to a limited artificial heat, the membrane, or filmy envelope constituting their external coating was capable of gradual extension, the granules increasing in size, and that at the same time globules were formed all over its surface, resembling new grains of fecula, attached by a hilum or minute scar to a membrane. “Analogy,” observes M. Raspail, “seems to point out before-hand that, under the influence of natural causes which affect vegetation, whose action, though slow, is durable, this development should possess a more regular character than under the influence of an artificial cause. What is thus indicated by

\* And by a F.L.S. in a paper read at one of the meetings, on the development of an Agamous plant, which the writer observed for several days, and remarked that the new cells rose consecutively from the points or edges of the old ones.—Ed.

analogy is proved by observation, in regard to the grains of fecula, which grow in the vegetable organs, till their forms and dimensions might render it difficult to recognise them. On the other hand, direct observation shows that, in consequence of this development, there are formed, in the interior of each grain of fecula, new feculent globules, which being packed together, present a very perfect resemblance to the cellular texture. Each of these grains of fecula, when obtained separate, is furnished with a hilum, by which it was connected with the inside of the cell which contained it, just as a bean is connected by its hilum with the placental parietes of the large cell which we call the pod. But this bean is not merely stuck on to the surface of the pod; it has been developed by the progressive swelling of the inside, and has passed successively through every dimension, from that of a microscopic globule to that which it possesses when ripe." The secondary grains whose presence we have detected in its interior (that is, of the primary vesicles), acted on by the same causes, will be developed in their turn, and will in their turn give rise to other tertiary grains, and so on indefinitely: so that we shall then have a more or less complicated cellular texture in the interior of a single cell. Now as these new cells are, at every period of their growth, attached to the sides of the generating cell, we can conceive that each of them is nothing else than the development of one of the globules of which the coats of the cells are composed."—*Rasp. El. on Chem.*

It has been before observed that the development of the cells of plants is materially influenced by the varying circumstances of pressure under which it takes place. When the pressure is unequally distributed, being less in one direction and at the same time considerable in all others, the cells will be much modified in their shape. They will be compressed according to the direction in which the pressure is applied, and the active principle of growth continuing to be exerted chiefly in the direction of least pressure\*, a series of elongated cells will be formed, approaching more or less to the form of tubes. To this modification of cellular structure, M. Link has given the name of elongated tissue. Sometimes the elongated cells, instead of being cylindrical, or prismatic, in their shape, are fusiform or spindle-shaped, that is, narrower at the extremities than in the middle. These are the clostres of M. Dutrochet. The medullary rays, or *striae*, found in the stems of dicotyledonous plants are also elongated cells, but placed in a

\* This is one reason, perhaps, why the vital membrane descends (as from the upper side of a wound on the stem of a tree) with more rapidity than it does from the sides or bottom.—Ed.

horizontal position, instead of a vertical one, which is the usual arrangement of the cellular texture.

We have only room for one more extract from this excellent lecture, relative to the visible existence of the fructification in the interior of the plant long before its development.

"A bulb consists of an internal firm pulpy substance, surrounded by a filmy envelope or cuticle, and coated with several layers of a loose fibrous expansion. In the centre of the coats will be found the future plant, which may be frequently observed fully developed in all its parts before there is any appearance of external vegetation. 'If the bulb of the tulip be taken up in the beginning of the month of January, and carefully bisected in a line passing through its longitudinal axis, the petals, the stamens, the pistil, and the incipient stem may be already all distinctly perceived, small and delicate in their appearance, but complete in all their parts.' "

Buds contain the rudiments of leaves and flowers. They consist of a scaly envelope, enclosing the proper bud, which is a pulpy substance, with numerous interlaced fibres, and surrounded by a thin cuticle. "In the month of March, 1810, I opened a bud of the horse-chestnut that had not yet burst its scales. The scales, which were about fifteen or sixteen in number, being removed, were found to contain one pair of opposite leaves, now laid bare, the divisions of which were closely matted together with a fine down. The leaves upon being opened were found to enclose a flower-spike, consisting of not less than a hundred florets compactly crowded together, and each enveloped in its own downy calyx, which when opened discovered the corolla, stamens, and pistil distinct, the rudiments of the future fruit being also discernible in the ovary."—*Keith, in Brewster's Journal.*

We earnestly recommend the import of the above extracts to the attention of our readers, more especially those who are not content with the mere knowledge of how to name and cultivate a plant, but have a wish to look into the structure, and satisfy themselves of the manner of the growth of vegetables. For although this be not necessary to the successful practice of gardening, it is a source of great mental satisfaction to the man who can account for, as well as direct the movements of his plants.

Another thing, the ideas of the accrescent powers of vegetables, contained in the above extracts, are far more rational than the old doctrine about the "*organisable*" property of the sap, about which so much has been said and written by former writers.

PLANTS FIGURED IN BOTANICAL PERIODICALS FOR MAY AND JUNE, 1834.—*Curtis's Botanical Magazine* contains figures and descriptions of—1. *Zycopetalum Mackaii*, a beautiful and curious flowering orchideous plant; 2. *Neottia calcarata*, spurred neottia, a West India genus, also belonging to orchidæ; 3. *Goldfussia anisophylla*, unequal-leaved goldfussia; 4. *Chilodia scutellarioides*, scutellaria-like chilodia; 5. *Saxifraga ligulata*, fringe-leaved saxifrage; 6. *Epacris impressa*, foveolated epacris; and 7. *Acacia prensans*, prickly-feathered acacia.

*Botanical Register* for June contains—1. *Verbena multifida*, var. *contracta*, a Chilian herbaceous plant, but hardy enough for a place in our flower borders; 2. *Gesnera allagophylla*, shifting-leaved gesnera, a stove didynamous plant, valued more for its rareness than for any particular beauty it possesses; 3. *Campanula garganica*, the harebell of St. Angelo, a pretty little trailing campanula, which Dr. Lindley thinks may survive our winters if it can be kept free from the chilling rains; 4. *Psoralea macrostachya*, long-spiked psoralea, a perennial herbaceous diadelphous plant, having purple spikes of flowers, but of no great beauty; 5. *Pentstemon staticifolius*, sea lavender-leaved pentstemon, a new hardy didynamous plant, raised from seed sent from California by the late lamented Mr. Douglas. One plant only exists in the garden of the Horticultural Society, but as it is a fine showy border flower, it is to be hoped that it will be extensively propagated.

*Sweet's British Flower Garden*. The May number contains—1. *Rhododendron venustum*, lovely rhododendron, one of the handsomest dwarf varieties of this magnificent genus; it should be in every collection, as it is perfectly hardy. 2. *Narcissus maximus*, great daffodil, a common name, but by no means a common species of the daffodil family. There are no doubt many varieties of this old favourite genus, but this in Mr. Don's opinion (as well as it was that of the late Messrs. Haworth and Sweet) is a real species. 3. *Abutilon pulchellum*, fragrant abutilon, a hardy shrub from New South Wales, bearing numerous small white flowers, diffusing a perfume somewhat like that of the hawthorn; it is a monadelphous plant, and belongs to the natural order *Malvaceæ*. 4. *Mutisia latifolia*, broad-leaved mutisia, a South American climbing herb of very remarkable habit; the stems being winged, and the midrib of each leaf produced into a long naked spirally convolute tendril, by which it supports itself on other plants. It is a syngenesious genus, and bears large white or purple flowers. It flowered for the first time in England in the collection of the Rev. Townsend Selwyn, of Kilmington Rectory, Wilts, and was beautifully figured and presented to Mr. Don by Miss Selwyn. To this plant Mr. Don has appended some

judicious scientific remarks regarding the true station of this genus in the order *Compositæ*, to which it belongs.

*The Flower Garden* for June contains—1. *Gilia coronopifolia*, buck's-horn-leaved gilia, a beautiful and showy North American annual herb, often before introduced into English gardens, but as frequently lost, owing to its not ripening seeds in this country. It is a pentandrious plant belonging to *Polemoniaceæ*, and has been introduced under various names, as Cantua, Ipomopsis, Ipomea, Polemonium, and Quamo-clit, but it is now united with the genus *Gilia*. If cultivated as Mr. Don directs, there is a probability it may soon rank as one of our tender annuals. 2. *Morisia hypogæa*, ground cress, a native of the Island of Sardinia, discovered on the mountains there by Professor Moris, in honour of whom it is named. It is a diminutive plant, bearing cruciform flowers on single scapes, and is recommended for rock-work, it being probably a perennial. 3. *Rhododendron nudiflorum*, var. *eximium*, choice rosebay or rhododendron. This variety is a child of art, having been obtained by impregnating the flowers of *Rhododendron nudiflorum* with pollen of the *R. arboreum*. We may take the liberty of noticing here, that the common name given to the rhododendron in the northern states of America has lately been adopted by British botanists, namely rosebay. In old books this English name was usually bestowed on the *Nerium oleander*, as well as to a species of *Epilobium*. 4. *Anthyllis Webbiana*, rose-coloured kidney vetch, a low creeping perennial herb, a native of the Peak of Teneriffe, where it was collected by Mr. Webb. It is a suitable plant for rock-work.

HORTICULTURAL SOCIETY OF LONDON.—The garden of this society was opened on the 6th inst. for an exhibition of fruit and flowers. The day was exceedingly propitious, and the company was consequently fully as brilliant and much more numerous than at the former exhibition. In the course of the afternoon between 5,000 and 6,000 persons of rank and fashion were present, among whom we noticed the Duke of Devonshire, Earl of Derby, Marquis of Bath, Lords Fitzwilliam, Rodney, Burlington, Ilchester, Countess of Radnor, the Archbishop of York and several other Bishops, Sir Charles Lemon, Sir Charles Monk, Sir John Nichol, Sir W. Proctor, Sir R. Jodrell, Baron Gurney, Admiral Sotheron, Sir Felix Booth, Sir W. Freemantle, Sir Charles Morgan, &c. The bands of the Coldstream and Grenadier Guards were stationed on the ground, and delighted the assemblage by playing a number of popular and martial airs. Altogether, the scene was of the liveliest and gayest description. Several marquees were erected in different parts of the gardens, under which, and on seats under trees,

the company sought shelter from the scorching rays of the sun: two large tents were set apart for the exhibition. The show of fruit was rather upon a limited scale, but in flowers the display was most brilliant, and excited the utmost attention of the admiring crowds. The following prizes were awarded:—

#### THE GOLD BANKSIAN MEDAL.

Miscellaneous collection of fruits from Mr. John Wilmot, F.H.S.

Orchideous plants from Messrs. Rollison, of Tooting.

Miscellaneous collection of plants from Mr. Lawrence, F.H.S.

#### THE LARGE SILVER MEDAL.

Grapes, &c., from Mr. Brown, of Acton Green.

Shaddocks from Sir C. Cockerell, Bart., F.H.S.

Pines from Mr. J. Davis, gardener to E. Gutterton, Esq. of Enfield.

Azaleas from Mr. Rivers, of Sawbridgeworth.

Pelargoniums from Messrs. Colley and Hill.

A miscellaneous collection of plants from Mr. Green, gardener to Sir Edward Antrobus, Bart.

A miscellaneous ditto from Messrs. Rollison, of Tooting.

#### THE BANKSIAN SILVER MEDAL.

Peaches and nectarines from P. D. Cooke, Esq., F.H.S.

Strawberries from Mr. Lane, gardener to J. H. Palmer, Esq., F.H.S.

Greenfleshed melons from Mr. Loudon, gardener to S. Gurney, Esq., F.H.S.

Twelve pelargoniums from Mr. Gaines, Surrey Lane, Battersea.

Miscellaneous pelargoniums from Mr. Cock, of Chiswick.

Heartsease from Mr. Mountjoy, of Ealing.

Heartsease from Mrs. Lawrence, F.H.S.

Calceolarias from Mr. John Green, gardener to Sir E. Antrobus, Bart., F.H.S.

Diosma rubra from Mrs. Lawrence, F.H.S.

Erica depressa from John Allnut, Esq. F.H.S.

Dentzia scabra from T. C. Palmer, Esq., F.H.S.

Miscellaneous roses from Mr. G. Leslie, gardener to John Fleming, Esq., F.H.S.

Cypripedium calceolus from N. H. Nugent, Esq., F.H.S.

Clianthus puniceus from W. Leveson Gower, Esq., F.H.S.

Cockscombs, balsams, &c., from Mr. George Mills, F.H.S.

Calceolarias from Messrs. Brown, of Slough.

Miscellaneous pelargoniums from Messrs. Colley and Hill of Hammersmith.

A miscellaneous collection of plants from Mr. Lane, gardener to H. Palmer, Esq.

Miscellaneous pelargoniums, &c. from Mr. Gaines, of Surrey Lane, Battersea.

Brugmansia arborea from Mr. R. Clarke, gardener to Sir Charles Lemon, Bart.

The company, after viewing the various collections of fruit and flowers, promenaded the delightful walks of the gardens, and the day was far advanced before the visitors quitted the grounds. The next exhibition will take place on the 4th of July.

These gardens are every year becoming more interesting to the subscribers, and to the public in general. The trees are advancing in height and the shrubs in volume, so as to give some idea of their stature and natural forms; and being all labelled, no questions need be asked of the attendants; in fact, for this purpose no attendant is required in perambulating either the arboretum or fruit departments of the garden.

Two other flower exhibitions have lately taken place in London; and, what is rather strange, were appointed by the managers to be held on the same days, viz. the 15th and 16th of June. The first announced was at the Surrey Zoological Gardens, where something of the same kind took place last year. The second, that of the Metropolitan Society of Florists, in the Regent's Park. Both exhibitions, we hear, were attended by very respectable assistants and exhibitors; but the spirit of rivalry has generated some rancorous feeling, which, to say the least of it, is exceedingly unseemly among the lovers of flowers.

The newspapers report that the exhibitors at the Surrey, after the business of the day, dined at the Horns, Kennington. Mr. Taylor took the chair, and was supported by many gentlemen in the Floricultural world, but unconnected with any other society of a similar description. Fifty sat down to dinner.

Mrs. Marryat, of Wimbledon, J. Alnutt, Esq., — Curtis, Esq., Mr. Young, of Epsom, Mr. Watts, Mr. Hogg, &c., &c. were among the fortunate exhibitors.

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## CALENDARIAL MEMORANDA FOR JULY.

### KITCHEN GARDEN.

NOTWITHSTANDING this garden is now full of good things, many of the crops being in the highest perfection, the gathering of them is not the only business of the superintendent; he must still be looking forward, and, indeed, very much of the produce of his labours coming into use when such produce is most valued, depends on what was done in the last, or what may still be done in the present month. Every gardener should have or make a true estimate of what is expected of him at all seasons; according to the family establishment in which he is employed, or according to the extent of ground and other means he has at command. And there is an old axiom which should be borne in mind—that *it is impossible to have enough of any one crop, without having too much.*

*Peas and common beans.*—Where there is ground, and seed, and time to spare, the last sowings of these vegetables may be made in the beginning of the month, if not done late in June. If the season be favourable they may yield a few dishes at an acceptable time: but they cannot be depended upon; and if August and September be dry they will require copious watering.

*Cabbage.*—Now put out a good piece of cabbage for winter use. Rich and deeply digged ground should be prepared for them on which they are planted in rows two feet apart, and somewhat less from each other in the rows. Give water after planting to assist them striking fresh roots. If there be no vacant ground for this purpose, the spaces between rowed crops, such as peas and beans, may be employed. The plan of having two, sometime three crops succeeding each other on the same ground, is often had recourse to by market gardeners; and may be done also in private gardens when pinched for room; but it is easiest practised with rowed crops, and in no case, nor at no time so frequently as in this very month. All winter crops of the cabbage kind, viz. borecole, Brussels sprouts, savoy, broccoli, &c, may be so disposed, and often with great advantage.

*Cauliflower.*—If the full quantity of Michaelmas cauliflowers are not already put out, this work should not be longer delayed. If sowed in May early setting out in their final stations is necessary to obtain bulk of leaves and head; and for the same end they must have rich ground, and moisture allowed.

*Celery.*—Continue to transplant celery either in single trenches with one row of plants along the middle, as is the ordinary practice, or in wide trenches of three or four feet, having the rows of plants placed cross-wise at one foot distance between. Celery is always allowed plenty of rich well-rotten dung to grow in. This accelerates the growth and adds to the bulk. In whichever way it is cultivated, whether in narrow or wide trenches, it is gradually earthed up by well-broken earth from the sides, as it advances in height; though when grown in narrow and shallow trenches, some practitioners care little about earthing it up, till it has gained nearly full size, and just before it is wanted for use, or requires banking up to protect it from the frost or cold rains of winter. This latter plan is adopted by market gardeners, who aim at great bulk rather than the quality of the plant. But in private gardens celery must be got ready for use as soon as possible, and therefore the earliest trenches must be kept constantly earthed up as the leaves advance in height. Some growers are at great pains to raise, and exult in having, celery of great size. This may be all very well for the culinary demands of hospitals, barracks, or city eating houses;



but, as it is well known, the ranker it is grown the less delicate it is in quality: moderate bulk is certainly best in private gardens.

*Savoy, Brussels sprouts, and the several sorts of Scottish kale or borecole.*—Full crops of all these should now be put in for winter use, if not done before; and if first crops have been already put out, second or succession plantings may now be made.

*Broccoli.*—Second or third succession crops of broccoli must now be put out for good. An open situation, well dressed and deeply-digged ground is absolutely necessary for these gross feeding plants; and water at planting, and occasionally afterwards, must not be withheld.

*Endive.*—Two sowings of this salad plant should be made in this month, in order to secure a good supply through the winter. There are several varieties; the curled white and green are both good; and the broad-leaved Batavian is also useful, as well for salads as for the cook. Prepare ground for receiving plants from seed-beds previously sown; it cannot be too rich if light and dry enough. Dib the seedlings in drills made by the hoe at fifteen-inch distances between; this renders watering at first, and blanching at last, easier performed. There are several methods pursued in blanching endive, viz. tying up the full grown leaves together by strands of mat, or earthing up like celery, or covering the plants with tiles or thin boards, or with reversed garden pots. The blanching should be conducted consecutively, so as always to have enough for the demand; three weeks or a month is sufficient for blanching endive.

*Lettuce.*—Sow and transplant the different sorts of lettuce to keep up a sufficient supply.

*Kidney Beans.*—If there has been no sowing made late in the previous month, a last sowing may be made in the beginning of this. Whether the plants raised at this time yield any crop depends entirely on the weather; and it is better perhaps to take all care of the advancing crops by constantly gathering the pods as they are produced, and affording regular supplies of water when needed, than trusting to this last sowing.

*Carrots.*—Sow another bed of carrots: they will be fit to draw in November, and through the winter if protected from frost.

*Onions.*—Sow a full crop to stand the winter; the last week in the month is the proper time; choose a sheltered, though not a shady spot of dry lying rich soil, on which sow pretty thickly. In the spring they may be thinned for use, and for transplanting.

*Spinach.*—Sow the winter crop of spinach in the last week of the month. The richer the ground, the stronger the crop; but moderately rich ground, so as it lies well to the sun, and rather dry than otherwise, is most suitable for this crop. Sprinkle a few seeds of the brown Dutch

cabbage lettuce and a little of that of the green coss ditto. Such lettuce seedlings stand the winter better among the spinach than if sown alone.

*Coleworts.*—About the middle of the month sow a large bed of early York cabbage, to be planted out in September, to be used as coleworts, that is, open cabbage. They are a delicious green during winter and spring; and some few of them which do not run, may be cut and used as spring cabbage.

*Turnips.*—Another sowing or rather two sowings of turnips should be made in this month for autumn and winter use. See that the fly does not attack the seedlings, which if they do the latter quickly disappear.

*Turnip-rooted Spanish and common Radish.*—This is a good season to sow the black and white Spanish radish for drawing in winter and in the following spring. The common sorts, viz. short-top and salmon, may also be sown about the end of the month for autumn service. If the ground be moist when sown, and if the season be not too dry, these roots arrive at great perfection. Other salad herbs, as mustard, cress, &c., may also be sown twice or thrice in the month.

The growing crops requiring attention at this time are sticking peas and kidney runner beans, pulling up onions that are fully ripe, and bending down the tops of those which are forward enough; earth up celery and cardoons; prune off the side shoots of artichokes to enlarge the topmost, and when the principal heads are gathered, break down the stems close to the ground; regulate and secure the vines of cucumber plants, allowing them plenty of water. Take up eschalots and garlick; gather herbs for drying, also seeds as they ripen. Destroy weeds, and keep the garden free from decayed crops, leaves, and all unsightly rubbish.

*Fruit Garden.*—The greater part of what was advised last month relative to the management of the trees and fruit is applicable in this. The summer treatment of the trees, if rightly and unceasingly performed, secures (as far as depends on skill and diligence) well-placed and well-ripened wood to yield a crop next year. It is only when the trees are in action that they can be trained into the desired form, and moulded into the wished-for habit. If allowed to produce a number of supernumerary shoots in this year, the roots will be so far excited as to impel a superfluous growth in the next, and consequently deranging that *moderate condition* in which all fruit trees should be kept.

The crops in the forcing houses and frames are ripe or ripening; to such no general observation can apply, except only that all fruits when ripening are improved in flavour by full exposure to dry air, and a

diminished supply of moisture at the root. Pines, peaches, grapes, melons, &c., are all improved by this treatment. Strawberries, which are now in full bearing, are also improved by drought, but as quantity is often preferred to quality, the latter is often sacrificed for the sake of the former.

Where insects, slugs, or snails, are annoying to ripening fruit, they must be captured or driven by some means from their prey ; and if disease appears, a remedy should be speedily applied, and administered either generally, if the absence of fruit permit, or topically if otherwise.

Where any budding of fruit trees is necessary, this is the season in which it should be performed, because the vital membrane or *cambium* of both bud and stock is now in that glutinous state, that a union or attachment with each other readily takes place.

*Flower Garden.*—The principal matters to be attended to in this department are to do, in the first place, those things which might or ought to have been done in June, viz. taking up bulbs and tubers whose foliage is dead, making cuttings of roses, of heaths, and of all other plants whose shoots are in a proper state for the purpose. Layering carnations and piping pinks should be done as soon as possible, and seedlings of these may be placed singly in beds or in small pots. Chrysanthemums require support ; such as are in small pots should be shifted into larger. Stake dahlias. New beds of pansies or heart's-ease may be made by offsets separated from the old plants. Tie up tall growing herbaceous flowers in the borders, and clear away all decayed stems and leaves. Sow seeds of biennial flowers. Regulate the patches of hardy annuals, and continue to put out tender annuals and rejected greenhouse plants in vacant spaces of the flower garden. Hot-house or greenhouse annuals may require shifting into larger pots, &c. &c. In fact, the business of the flower gardener is so multifarious at this season, that it is impossible to name one-hundredth part of the plants which now require his special attention. Sowing, transplanting, shifting, thinning and pruning, propagating by layers and cuttings, propping, shading, and watering, is one or other, or sometimes all, his every day's task. His main object is to keep up a continued display of everything which is gay and beautiful throughout the season, tribe succeeding tribe in endless succession, requiring no small share of study so to sow or plant in one season that shall produce the desired results at another.

## REMARKS ON THE WEATHER.

DURING the first five days of the present month we had variable weather, with harsh, sometimes cold and chilly wind from the east or northward. On the sixth it set in dry and remarkably warm, and continues pretty regularly so nearly up to the present time, though not without some of those sudden changes of temperature which are so often experienced in this climate. On one occasion the thermometer varied from  $82^{\circ}$  to  $52^{\circ}$  in the course of twenty-four hours. There have been some thunder storms in different parts of the kingdom, which being accompanied with hail, have caused some damage to both field and garden crops in Cambridgeshire and other places.

Vegetation, assisted by the previous fine rains, and prompted by the high temperature which followed, came on rapidly. Peas and other culinary crops were quickly plentiful. Strawberries and cherries are already abundant in the London market, the latter not half ripe, by the bye ; but such is the avidity with which everything fresh or *new* is bought up, that much money is made of both young fruit, cherries and gooseberries ; and vegetables, as potatoes, for instance, in a state in which they can scarcely be considered either palatable or wholesome.

The aphid has been, as usual, prevalent, especially on sickly wall trees, on hops and other plants, and have required much laborious attention to free peach and nectarine trees from their attack. Orchard fruit appears to be everywhere plentiful.

For the last three days we have had abundant rain, with the wind at south-west.

*June 27, 1835.*

PAXTON'S  
HORTICULTURAL REGISTER,  
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HORTICULTURE.

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ON THE CULTIVATION OF THE CAULIFLOWER.

IN our last number we had occasion to make some remarks on the physical constitution of that variety of the cabbage called cauliflower ; and, as we then promised, now proceed to detail the ordinary modes of culture, together with some account of the means and manner of accelerating the growth and early production of this favourite vegetable, as practised long ago by ourselves and others. This, in the estimation of many readers, will be considered of ten times more importance than any descant of abstract notions relative to the physiology of the plant. The one is certainly more immediately useful than the other ; but both are necessary to the man who wishes to obtain a thorough insight into the nature of this, or any other object of his care.

In taking up the pen with this view we cannot forget that we wrote five or six years ago, for the Gardener's Magazine, a short paper on the same subject, which was published in that periodical, and thence into several other books ; so that what we are now about to advance cannot be called original matter. But, as it is probable many young readers of the Register may not have seen that paper, there can be no harm, on their account, to give a new version of it. Advice, if good, can hardly be too often repeated ; and practical rules, if of any use, cannot be too often inculcated.

No practical man can be ignorant that the proper time for sowing cauliflower seed for the earliest spring crop is on, or about, the twenty-

fourth of August. It is, however, better to sow twice about that time; say on the twenty-first, and again on the twenty-eighth. If the seed be sown sooner than the twentieth, the plants are likely to produce flowers too soon and of too small a size for use; and if not sown till after the end of the month, the flowers are not produced so soon in the following season as if the seeds were sown a week earlier.

A dry lying sunny border of rich light soil is most suitable for a seed-bed. This should be dug and made fine by the spade; sow regularly, and not too thick, in order that the seedlings may be drawn with more safety when they are large enough to be pricked out into nursery-beds. The seeds being very small only require pressing into the soil with the teeth of a rake, and afterwards raking level. When the seedlings appear protect them from birds and slugs; and if the weather be dry give water to bring them forward.

Towards the latter end of September, the young plants will be fit to handle; a bed, being of like quality and having a similar aspect, should be chosen and got ready to receive the seedlings. The strongest, soundest, and most perfect plants are raised carefully from the seed-bed, and pricked into the nursing bed, in rows four inches apart and the same distances between plant and plant. If it be necessary to prick out a considerable number, the ground should be divided into beds three feet wide with one-foot alleys between; this is for the purpose of placing hoops over the beds to bear coverings of mats in severe weather. This is particularly necessary where there is not the convenience of glazed frames, or hand-glasses; as when these may be had the plants are at once pricked out into them and covered by the lights, when the plants require such protection. In using a frame for a nursing-bed, the soil within should be raised so that the plants be kept as near the glass as possible; otherwise they are liable to be too much drawn in the stems. And, in that situation, require at all times full air and light to render them sufficiently hardy to withstand the frosts of winter. In giving protection against frosts, however, care must be taken not to give it *unnecessarily*; because the plants become so tender under coverings that the least accidental exposure destroys them.

The sooner cauliflower-plants are pricked out into nursery-beds, the stronger they become during the winter; and of course, in fine condition to take their final stations in the spring; but, it has been found that these do not resist frost so well as if they had stood in the seed-bed till November, and then pricked out. The reason is this, those set out in September are in a state of active growth when frost usually sets in, and are consequently more easily hurt; whereas those pricked

out in November are inactive, in consequence of the check received in removal, and therefore less likely to suffer from frost.

Protecting cauliflower plants under bell or hand glasses, is one of the most common expedients in kitchen gardening, and is executed as follows, viz. :—a border, on the end or side of a compartment in the open garden, is prepared by having a good coat of rich dung deeply dug in. The ground is divided into four feet-wide-beds, with two-feet-wide alleys between. Along the middle of the bed, or beds, a rank of hand-glasses is placed, by line, two feet apart from each other. Within the impressions made by the bottoms of the glasses, four or six of the best and healthiest plants are drawn from the seed or nursing-bed, and dibbed or let in with a trowel. Three or four of these plants are intended to perfect their heads on the spot; the supernumeraries to be transplanted to some other place in the spring. When the planting is finished a little water may be given to each to settle the earth about their roots, especially if the soil, or weather, be dry, as sometimes happens in the month of October, the proper season for the performance of this work. The glasses are then put on for the winter, but, on the morning of every fine day, the south fronts of the glasses are raised on a brick-bat to admit fresh air, but shut down close again at night.

This is the only protection and attention required by the plants throughout the winter, except, perhaps, taking the glasses entirely off in the middle of a mild day, stirring up the surface of the earth among the plants, and taking away dead or dying leaves, and replacing the glasses before night. Attention should also be given that no snails or slugs take up their winter quarters within the glasses, because these would assuredly injure the plants one way or other. If any enemy of the kind appear, a dusting of hot lime, or a sprinkling of lime-water, will kill or drive them away.

The plants so treated will, during the month of March, be advancing rapidly, and about the beginning of April will have filled the glasses with their leaves. When this takes place the supernumeraries must be removed, and those that remain well earthed up, at the same time forming a kind of basin round the stems to hold water, copious supplies of which will be required occasionally, if the season be dry. At this time also, the glasses are raised all round, by being set on three or four brick-bats, to give head-room, till about the beginning of May, when they may be entirely laid aside.

Cauliflower plants cultivated in this way are the first ready for table, and very often come in too much together for private use, too many hand-glasses, therefore, need not be employed; for those plants which have stood, perhaps, exposed to the open air all winter unscathed, will

come in for use very shortly after those in hand-glasses. The progress of the plants depends greatly on the mildness or severity of the winter ; if not very severe, whether under protection or not, the plants are advanced accordingly ; but in extremely hard frost every exposed plant is liable to be cut off.

Early cauliflowers are one of the principal delicacies of the season, and the earlier they can be had for table the more they are valued. No wonder then that practical men have employed their skill and attention in accelerating the growth of the plant. In places where a high style of gardening is carried on, and where there are forcing-houses of different descriptions, another method of obtaining an early crop is had recourse to, and, when carefully conducted, with very great success. As soon as the seedlings have got two or three leaves, they are raised from the seed-bed and planted in sixty-sized pots, filled with very rich compost. When potted they are watered, and plunged in the earth of a cold frame, prepared to receive them, and pretty near the glass. They must have fresh air daily by raising the lights at the back, and kept duly watered. As soon as the roots have reached the outside of the ball of earth, they must be immediately shifted into forty-eight-sized pots, in similar compost, watered, and replunged again into the frame. In another month the plants will require thirty-two-sized pots, afterwards twenty-fours, and, ultimately, about the first of March, sixteens. When fairly established in these last pots, say about the first of April, they are removed from the frame into a peach-house or vinery, and placed along the front platform of the house in pans of water. Here they should have as much fresh air as can be allowed them, and carefully supplied with water ; for if in any stage of their growth, more especially after being taken into the house, the roots at any time become dry, the plants immediately "button."

About the middle of April they may be taken out of the house and turned out of the pots into pits made to receive them, either upon a south border, or in the alleys between asparagus beds. In these places they should be pitted four inches below the common surface of the ground, and have the earth drawn to their stems to keep them steady. Should frosty nights occur after they are out, a few fir-boughs, stuck round and so as to lean over them, will be a sufficient defence.

Cauliflowers managed in this way generally produce fine heads about the first of May ; but it will readily occur to practical men that they may be made to yield flowers even earlier than this date, *if moderate*, instead of *full-sized*, heads would suffice ; because stinting them of water for the last week they are in the house would certainly advance their flowering by a week or ten days.



This method of cultivating cauliflowers is not practised so much, perhaps, as it deserves to be. Like all other schemes of forcing culinary vegetables, it is attended with some labour, and consequent expense ; but the gratification of partaking of such a delicacy ten days or a fortnight before the ordinary season, would be considered by very many a high treat.

The flowering of full grown plants may be hastened, it seems, by quite a novel proceeding, discovered or recommended, we think, by a correspondent of the " Irish Farmer's and Gardener's Magazine." If the stem of a cauliflower plant, which is nearly full-grown, be nearly cut through near the ground, and be supported by a stake or stakes to prevent it being entirely broken off, the flower will come forth sooner than if the stem had not been wounded at all. This, by the bye, is quite a natural consequence, because the growth of the exterior members being stopped, the remaining vitality being central is exerted against the flower and which is thereby forced forth alone. Thus we often see plants of the same genus with the cauliflower, when cut over and thrown upon the bare ground, or rubbish-heap, perfect their flowers without any assistance from roots.

A few more observations may be added relative to potted cauliflowers : —We have already observed that they must never be allowed to become dry at the root, until the heads are required for use ; and while in the frame be defended from snails and slugs, which are sometimes a great annoyance. Air must be given as often as it can be done with safety ; and in very hard frosts the frame should be covered with a mat at night. Much attention is required to hit the right time for shifting, for if once the roots become matted round the pot, there is great risk of the plant " buttoning."

The foregoing observations relate to what may be called the superior methods of cultivating cauliflowers ; but they may be cultivated without the assistance of either glass or hothouses, and with no further trouble than protecting the plants from severe frost during winter. With this view the seedlings are pricked out upon a warm dry border and hooped over, as already mentioned ; and being covered in hard frost, they are preserved till about the middle of March, when they may be planted out for good. A sheltered, rich spot of ground is always chosen, dunged, and well-dugged ; the plants are dibbed in by line two feet asunder every way, and afterwards kept clean and earthed up by the hoe. These plants yield their heads about the beginning of June, sooner or later, according to the favourableness of the spring months.

The above are called the spring crop ; but in order to have a succession of flowers through the summer, two sowings must be made in the

spring. The first should be raised on a little heat, or under hand-glasses, close to a south wall, in the month of February, and afterwards pricked out in a cold frame, to be nursed till they are of sufficient size, and until the season serves for planting them out for good. These, with some of the underlings of the autumn sowings, will come in after the spring crop. The second sowing is made about the twenty-fifth of April. These are commonly called Michaelmas cauliflowers, and come in about that holiday; and last till the frost destroys them. But as many flowers are in prime order in November, when sharp frosts may be expected, it is usual to secure all the best by digging them up, tripping off the greater part of the outside leaves, and hanging them by the heels in a warm shed or dry cellar, or stowing them upright and close together in dry earth in a spare hotbed frame, or pit, where they may be safe from frost and damp. In this way cauliflowers may be kept good, very often till February. Some writers advise the heads intended to be stored in winter, to be buried in tubs, or boxes, of pure peat-earth; that is, such as is as free from sand or other earthy particles as possible—the antiseptic qualities of which preserve the heads good for a long time, if kept excluded from air. They, however, require to be thoroughly washed before they are sent to the kitchen.

There are two varieties of cauliflower in cultivation, namely, the early and the late. The first is the most delicate, the second somewhat more hardy. Both require similar treatment, and both arrive at the greatest size in the richest soil. At genteel tables the flowers are considered in the greatest perfection when they measure about three or four inches over; because then they are both very firm, and delicately white. But a much larger size is required in French cookery, when a whole single flower is intended to form an entire and principal dish.

In saving seed, the whitest, earliest, and firmest heads should be chosen: and when the head begins to open, a portion of the branches should be thinned out, to give room and more strength to those which are left to mature seed. In the northern counties of England and Scotland, the seeds do not ripen abundantly, unless the plants are placed close to a south wall, and the branched head fastened close up to it by nails and shreds. No seed is easier adulterated than that of the cauliflower, if any other congenerous plant be near and in flower at the same time. This, however, is a fact so well known that it can hardly be forgotten by the seed-grower.

## ON COVERING FRUIT TREES.

BY H. C.

IN Number XLIII. of the *Horticultural Register*, I observe in a communication by Mr. William Grey, he seems to think the trees under Mr. Eaton's care are not benefited by the covering he has adopted. I think, on the contrary, that they are of great use; for while the wall-trees at most places round here are in a sad state of blight, his have the most healthy appearance; are neither blighted, mildewed, or cankered; they have had the same treatment they used to have previously to his having the curtain; and many of them are growing in the same soil that those did which died in the cankered state he mentions in his communication.

Being a young gardener, and wishing for information, I should be obliged to Mr. Grey, or any other correspondent, if they will inform me, through the medium of the *Register*, what it is that causes the marked difference in his trees, if it be not the covering?

In the place I am now living at, we have adopted the same sort of covering for some tender exotics, which we planted against the open wall last autumn; but not having much frost last winter, with the exception of a night or two (the thermometer indicated 14° of frost on the 20th of January), I am unable to say if they will afford that protection which they require.

I am sorry to see you discontinue the account of new plants figured in the different periodicals: I hope you will resume the account, as many besides myself consider it one of the most useful portions of the *Horticultural Register*.

H C.

Dorset, June 20, 1835.

## ON THE MILDEW OF PLANTS.

BY THE AUTHOR OF THE DOMESTIC GARDENER'S MANUAL, C. M. H. S.

My opinion has been requested on the following subject, and the queries which are annexed:—

“It has been long ago discovered, that strong soap-lather applied to the leaves or shoots of plants infected with the mildew, destroys that parasite, and res-

“Query 1. Which quality of the soap is it that is thus effectual? and—

“Query 2. Would a solution of soda in pure water answer the same purpose of the gardener?”

I have bent my attention to this important subject; and only regret that to the present time, and ever since the inquiry was made, I have had no satisfactory means at hand to afford a fully practical demonstration of the efficacy of the chemical agents which are particularly mentioned. Last year, a very fine bed of the damask rose was so completely infested with the fungus, that the leaves curled up, thickened, assumed an appearance as if they had been coated with starch, and in all respects were totally changed. Had I at this time such an opportunity afforded me, I could ere now have arrived at something like a definite conclusion. I however destroyed my bed, transplanted my bushes in October, and find that scarcely one in ten has survived. The only specimens of mildew which I have met with during the late spring have been seen on the terminations of two or three laterals upon my espalier apple-trees; and these, I have reason to think, were produced by the sudden and powerful heat which set in about the first week of the present month. On these affected shoots, I have performed several experiments, and shall, in a few words, describe the agents I have made use of. Before I do this, however, I must observe, that although I have not as yet assured myself of a certain curative remedy, I have discovered an active agent, which, while it confirms one of Mr. Main's assertions, leads to a reply to the second query. If, for want of data, I cannot practically answer the questions which apply to the curative agency of soap, I am enabled to present to the reader who may take interest in the proposed subject, certain facts upon which he may rely, and on them found a series of experiments which may lead to satisfactory results.

The *chemical composition of soap* requires our first notice.

Common soap is composed of *soda* and *fatty* substances, as those of tallow, grease, oil, and the like: it varies in colour, consistence, and odour, according to the nature and condition of the materials employed. I do not mean to speak of the *manufactory* of soap; that would involve an inquiry irrelevant to the subject; but simply to furnish a general idea of the ingredients of which soap is composed. The *soda* or *mineral alkali* made use of by the soap-boiler, is not however that article which is sold by the druggist; it is a liquid in a caustic state, that is to say, it is soda deprived of the carbonic acid (which renders it mild) by the agency of a certain quantity of quick-lime. Let any curious reader take half an ounce of common crystals of soda: on applying his tongue

to one of them, the taste may be found saline and disagreeable, but no unpleasant effect will be produced on the tongue. Then let him powder and dissolve it in as much boiling water as will, stirring with a tea-spoon, render it fluid. To this solution—kept boiling hot—let a tea-spoonful or two of powdered quick-lime be added; and in a very few seconds a change will be perceptible; for, on applying the *minutest* drop to the tongue, a burning pungency will be discovered. In fact, were the process carried on till all the neutralising carbonic acid were taken from the soda by the lime, the skin of the tongue would be destroyed, and a wound created by any incautious application of the liquid. Things being in this state, let a little sweet (olive) or other oil be poured into a phial with an equal quantity of soft water, then add a few drops of the caustic soda liquor, and agitate the contents of the phial. If due proportions be employed, an *emulsion*, as it used to be termed, will be formed; but, chemically speaking, soap will be produced by the union of the caustic soda with the oil, though it will be in a fluid state, being held in solution by water.

Now, in testing the efficacy of soap in the cure of mildew, the foregoing and other processes should be performed; and I shall shortly show that thereby the questions I proposed may be completely solved. *Soft soap*, the substance chiefly employed and recommended by gardeners, is not a combination of soda and greasy matter: in the preparation of this useful material, caustic *potash* is substituted for *soda*; and they who are so inclined, may operate with these two materials in the manner above recommended—that is to say, mild potash (called *carbonate of potassa*) may be tried in solution upon diseased leaves: this solution may be deprived of the neutralising acid, and rendered caustic by the addition of quick-lime, and then it will combine with oily substances.

Thus I have collected together materials for a course of experiments, and it remains to mention how far I myself have been able to proceed. I stated at the commencement of this article, that I had discovered the mildew upon one or two solitary laterals of apple-trees: to these I applied chemical agents thus prepared. One ounce of the crystals of soda was dissolved in seven fluid ounces of water: the taste of this liquor was far from potent: I plunged the diseased twig into it over night, but did not leave it immersed for one minute. On the following morning every leaf was found killed, and of the colour of rust of iron. I rendered the solution slightly caustic by the addition of a few small pieces of very inert lime, not using any heat. The taste became slightly pungent; and I then diluted one fluid ounce with three ounces of rain water. Another twig was tested in a similar manner with the

cabbage lettuce and a little of that of the green coss ditto. Such lettuce seedlings stand the winter better among the spinach than if sown alone.

*Coleworts*.—About the middle of the month sow a large bed of early York cabbage, to be planted out in September, to be used as coleworts, that is, open cabbage. They are a delicious green during winter and spring; and some few of them which do not run, may be cut and used as spring cabbage.

*Turnips*.—Another sowing or rather two sowings of turnips should be made in this month for autumn and winter use. See that the fly does not attack the seedlings, which if they do the latter quickly disappear.

*Turnip-rooted Spanish and common Radish*.—This is a good season to sow the black and white Spanish radish for drawing in winter and in the following spring. The common sorts, viz. short-top and salmon, may also be sown about the end of the month for autumn service. If the ground be moist when sown, and if the season be not too dry, these roots arrive at great perfection. Other salad herbs, as mustard, cress, &c., may also be sown twice or thrice in the month.

The growing crops requiring attention at this time are sticking peas and kidney runner beans, pulling up onions that are fully ripe, and bending down the tops of those which are forward enough; earth up celery and cardoons; prune off the side shoots of artichokes to enlarge the topmost, and when the principal heads are gathered, break down the stems close to the ground; regulate and secure the vines of cucumber plants, allowing them plenty of water. Take up eschalots and garlick; gather herbs for drying, also seeds as they ripen. Destroy weeds, and keep the garden free from decayed crops, leaves, and all unsightly rubbish.

*Fruit Garden*.—The greater part of what was advised last month relative to the management of the trees and fruit is applicable in this. The summer treatment of the trees, if rightly and unceasingly performed, secures (as far as depends on skill and diligence) well-placed and well-ripened wood to yield a crop next year. It is only when the trees are in action that they can be trained into the desired form, and moulded into the wished-for habit. If allowed to produce a number of supernumerary shoots in this year, the roots will be so far excited as to impel a superfluous growth in the next, and consequently deranging that *moderate condition* in which all fruit trees should be kept.

The crops in the forcing houses and frames are ripe or ripening; to such no general observation can apply, except only that all fruits when ripening are improved in flavour by full exposure to dry air, and a

diminished supply of moisture at the root. Pines, peaches, grapes, melons, &c., are all improved by this treatment. Strawberries, which are now in full bearing, are also improved by drought, but as quantity is often preferred to quality, the latter is often sacrificed for the sake of the former.

Where insects, slugs, or snails, are annoying to ripening fruit, they must be captured or driven by some means from their prey; and if disease appears, a remedy should be speedily applied, and administered either generally, if the absence of fruit permit, or topically if otherwise.

Where any budding of fruit trees is necessary, this is the season in which it should be performed, because the vital membrane or *cambium* of both bud and stock is now in that glutinous state, that a union or attachment with each other readily takes place.

*Flower Garden.*—The principal matters to be attended to in this department are to do, in the first place, those things which might or ought to have been done in June, viz. taking up bulbs and tubers whose foliage is dead, making cuttings of roses, of heaths, and of all other plants whose shoots are in a proper state for the purpose. Layering carnations and piping pinks should be done as soon as possible, and seedlings of these may be placed singly in beds or in small pots. Chrysanthemums require support; such as are in small pots should be shifted into larger. Stake dahlias. New beds of pansies or heart's-ease may be made by offsets separated from the old plants. Tie up tall growing herbaceous flowers in the borders, and clear away all decayed stems and leaves. Sow seeds of biennial flowers. Regulate the patches of hardy annuals, and continue to put out tender annuals and rejected greenhouse plants in vacant spaces of the flower garden. Hot-house or greenhouse annuals may require shifting into larger pots, &c. &c. In fact, the business of the flower gardener is so multifarious at this season, that it is impossible to name one-hundredth part of the plants which now require his special attention. Sowing, transplanting, shifting, thinning and pruning, propagating by layers and cuttings, propping, shading, and watering, is one or other, or sometimes all, his every day's task. His main object is to keep up a continued display of everything which is gay and beautiful throughout the season, tribe succeeding tribe in endless succession, requiring no small share of study so to sow or plant in one season that shall produce the desired results at another.

## REMARKS ON THE WEATHER.

DURING the first five days of the present month we had variable weather, with harsh, sometimes cold and chilly wind from the east or northward. On the sixth it set in dry and remarkably warm, and continues pretty regularly so nearly up to the present time, though not without some of those sudden changes of temperature which are so often experienced in this climate. On one occasion the thermometer varied from 82° to 52° in the course of twenty-four hours. There have been some thunder storms in different parts of the kingdom, which being accompanied with hail, have caused some damage to both field and garden crops in Cambridgeshire and other places.

Vegetation, assisted by the previous fine rains, and prompted by the high temperature which followed, came on rapidly. Peas and other culinary crops were quickly plentiful. Strawberries and cherries are already abundant in the London market, the latter not half ripe, by the bye ; but such is the avidity with which everything fresh or *new* is bought up, that much money is made of both young fruit, cherries and gooseberries ; and vegetables, as potatoes, for instance, in a state in which they can scarcely be considered either palatable or wholesome.

The aphid has been, as usual, prevalent, especially on sickly wall trees, on hops and other plants, and have required much laborious attention to free peach and nectarine trees from their attack. Orchard fruit appears to be everywhere plentiful.

For the last three days we have had abundant rain, with the wind at south-west.

*June 27, 1835.*



# PAXTON'S HORTICULTURAL REGISTER,

AUGUST, 1835.

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## HORTICULTURE.

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### ON THE CULTIVATION OF THE CAULIFLOWER.

IN our last number we had occasion to make some remarks on the physical constitution of that variety of the cabbage called cauliflower ; and, as we then promised, now proceed to detail the ordinary modes of culture, together with some account of the means and manner of accelerating the growth and early production of this favourite vegetable, as practised long ago by ourselves and others. This, in the estimation of many readers, will be considered of ten times more importance than any descant of abstract notions relative to the physiology of the plant. The one is certainly more immediately useful than the other ; but both are necessary to the man who wishes to obtain a thorough insight into the nature of this, or any other object of his care.

In taking up the pen with this view we cannot forget that we wrote five or six years ago, for the *Gardener's Magazine*, a short paper on the same subject, which was published in that periodical, and thence into several other books ; so that what we are now about to advance cannot be called original matter. But, as it is probable many young readers of the *Register* may not have seen that paper, there can be no harm, on their account, to give a new version of it. Advice, if good, can hardly be too often repeated ; and practical rules, if of any use, cannot be too often inculcated.

No practical man can be ignorant that the proper time for sowing cauliflower seed for the earliest spring crop is on, or about, the twenty-

fourth of August. It is, however, better to sow twice about that time; say on the twenty-first, and again on the twenty-eighth. If the seed be sown sooner than the twentieth, the plants are likely to produce flowers too soon and of too small a size for use; and if not sown till after the end of the month, the flowers are not produced so soon in the following season as if the seeds were sown a week earlier.

A dry lying sunny border of rich light soil is most suitable for a seed-bed. This should be dug and made fine by the spade; sow regularly, and not too thick, in order that the seedlings may be drawn with more safety when they are large enough to be pricked out into nursery-beds. The seeds being very small only require pressing into the soil with the teeth of a rake, and afterwards raking level. When the seedlings appear protect them from birds and slugs; and if the weather be dry give water to bring them forward.

Towards the latter end of September, the young plants will be fit to handle; a bed, being of like quality and having a similar aspect, should be chosen and got ready to receive the seedlings. The strongest, soundest, and most perfect plants are raised carefully from the seed-bed, and pricked into the nursing bed, in rows four inches apart and the same distances between plant and plant. If it be necessary to prick out a considerable number, the ground should be divided into beds three feet wide with one-foot alleys between; this is for the purpose of placing hoops over the beds to bear coverings of mats in severe weather. This is particularly necessary where there is not the convenience of glazed frames, or hand-glasses; as when these may be had the plants are at once pricked out into them and covered by the lights, when the plants require such protection. In using a frame for a nursing-bed, the soil within should be raised so that the plants be kept as near the glass as possible; otherwise they are liable to be too much drawn in the stems. And, in that situation, require at all times full air and light to render them sufficiently hardy to withstand the frosts of winter. In giving protection against frosts, however, care must be taken not to give it *unnecessarily*; because the plants become so tender under coverings that the least accidental exposure destroys them.

The sooner cauliflower-plants are pricked out into nursery-beds, the stronger they become during the winter; and of course, in fine condition to take their final stations in the spring; but, it has been found that these do not resist frost so well as if they had stood in the seed-bed till November, and then pricked out. The reason is this, those set out in September are in a state of active growth when frost usually sets in, and are consequently more easily hurt; whereas those pricked

out in November are inactive, in consequence of the check received in removal, and therefore less likely to suffer from frost.

Protecting cauliflower plants under bell or hand glasses, is one of the most common expedients in kitchen gardening, and is executed as follows, viz. :—a border, on the end or side of a compartment in the open garden, is prepared by having a good coat of rich dung deeply dug in. The ground is divided into four feet-wide-beds, with two-feet-wide alleys between. Along the middle of the bed, or beds, a rank of hand-glasses is placed, by line, two feet apart from each other. Within the impressions made by the bottoms of the glasses, four or six of the best and healthiest plants are drawn from the seed or nursing-bed, and dibbed or let in with a trowel. Three or four of these plants are intended to perfect their heads on the spot; the supernumeraries to be transplanted to some other place in the spring. When the planting is finished a little water may be given to each to settle the earth about their roots, especially if the soil, or weather, be dry, as sometimes happens in the month of October, the proper season for the performance of this work. The glasses are then put on for the winter, but, on the morning of every fine day, the south fronts of the glasses are raised on a brick-bat to admit fresh air, but shut down close again at night.

This is the only protection and attention required by the plants throughout the winter, except, perhaps, taking the glasses entirely off in the middle of a mild day, stirring up the surface of the earth among the plants, and taking away dead or dying leaves, and replacing the glasses before night. Attention should also be given that no snails or slugs take up their winter quarters within the glasses, because these would assuredly injure the plants one way or other. If any enemy of the kind appear, a dusting of hot lime, or a sprinkling of lime-water, will kill or drive them away.

The plants so treated will, during the month of March, be advancing rapidly, and about the beginning of April will have filled the glasses with their leaves. When this takes place the supernumeraries must be removed, and those that remain well earthed up, at the same time forming a kind of basin round the stems to hold water, copious supplies of which will be required occasionally, if the season be dry. At this time also, the glasses are raised all round, by being set on three or four brick-bats, to give head-room, till about the beginning of May, when they may be entirely laid aside.

Cauliflower plants cultivated in this way are the first ready for table, and very often come in too much together for private use, too many hand-glasses, therefore, need not be employed; for those plants which have stood, perhaps, exposed to the open air all winter unscathed, will

come in for use very shortly after those in hand-glasses. The progress of the plants depends greatly on the mildness or severity of the winter ; if not very severe, whether under protection or not, the plants are advanced accordingly ; but in extremely hard frost every exposed plant is liable to be cut off.

Early cauliflowers are one of the principal delicacies of the season, and the earlier they can be had for table the more they are valued. No wonder then that practical men have employed their skill and attention in accelerating the growth of the plant. In places where a high style of gardening is carried on, and where there are forcing-houses of different descriptions, another method of obtaining an early crop is had recourse to, and, when carefully conducted, with very great success. As soon as the seedlings have got two or three leaves, they are raised from the seed-bed and planted in sixty-sized pots, filled with very rich compost. When potted they are watered, and plunged in the earth of a cold frame, prepared to receive them, and pretty near the glass. They must have fresh air daily by raising the lights at the back, and kept duly watered. As soon as the roots have reached the outside of the ball of earth, they must be immediately shifted into forty-eight-sized pots, in similar compost, watered, and replunged again into the frame. In another month the plants will require thirty-two-sized pots, afterwards twenty-fours, and, ultimately, about the first of March, sixteens. When fairly established in these last pots, say about the first of April, they are removed from the frame into a peach-house or vinery, and placed along the front platform of the house in pans of water. Here they should have as much fresh air as can be allowed them, and carefully supplied with water ; for if in any stage of their growth, more especially after being taken into the house, the roots at any time become dry, the plants immediately "button."

About the middle of April they may be taken out of the house and turned out of the pots into pits made to receive them, either upon a south border, or in the alleys between asparagus beds. In these places they should be pitted four inches below the common surface of the ground, and have the earth drawn to their stems to keep them steady. Should frosty nights occur after they are out, a few fir-boughs, stuck round and so as to lean over them, will be a sufficient defence.

- Cauliflowers managed in this way generally produce fine heads about the first of May ; but it will readily occur to practical men that they may be made to yield flowers even earlier than this date, *if moderate*, instead of *full-sized*, heads would suffice ; because stinting them of water for the last week they are in the house would certainly advance their flowering by a week or ten days.

This method of cultivating cauliflowers is not practised so much, perhaps, as it deserves to be. Like all other schemes of forcing culinary vegetables, it is attended with some labour, and consequent expense ; but the gratification of partaking of such a delicacy ~~ten~~ days or a fortnight before the ordinary season, would be considered by very many a high treat.

The flowering of full grown plants may be hastened, it seems, by quite a novel proceeding, discovered or recommended, we think, by a correspondent of the "Irish Farmer's and Gardener's Magazine." If the stem of a cauliflower plant, which is nearly full-grown, be nearly cut through near the ground, and be supported by a stake or stakes to prevent it being entirely broken off, the flower will come forth sooner than if the stem had not been wounded at all. This, by the bye, is quite a natural consequence, because the growth of the exterior members being stopped, the remaining vitality being central is exerted against the flower and which is thereby forced forth alone. Thus we often see plants of the same genus with the cauliflower, when cut over and thrown upon the bare ground, or rubbish-heap, perfect their flowers without any assistance from roots.

A few more observations may be added relative to potted cauliflowers : —We have already observed that they must never be allowed to become dry at the root, until the heads are required for use ; and while in the frame be defended from snails and slugs, which are sometimes a great annoyance. Air must be given as often as it can be done with safety ; and in very hard frosts the frame should be covered with a mat at night. Much attention is required to hit the right time for shifting, for if once the roots become matted round the pot, there is great risk of the plant "buttoning."

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The above are called the spring crop ; but in order to have a succession of flowers through the summer, two sowings must be made in the

spring. The first should be raised on a little heat, or under hand-glasses, close to a south wall, in the month of February, and afterwards pricked out in a cold frame, to be nursed till they are of sufficient size, and until the season serves for planting them out for good. These, with some of the underlings of the autumn sowings, will come in after the spring crop. The second sowing is made about the twenty-fifth of April. These are commonly called Michaelmas cauliflowers, and come in about that holiday; and last till the frost destroys them. But as many flowers are in prime order in November, when sharp frosts may be expected, it is usual to secure all the best by digging them up, trimming off the greater part of the outside leaves, and hanging them by the heels in a warm shed or dry cellar, or stowing them upright and close together in dry earth in a spare hotbed frame, or pit, where they may be safe from frost and damp. In this way cauliflowers may be kept good, very often till February. Some writers advise the heads intended to be stored in winter, to be buried in tubs, or boxes, of pure peat-earth; that is, such as is as free from sand or other earthy particles as possible—the antiseptic qualities of which preserve the heads good for a long time, if kept excluded from air. They, however, require to be thoroughly washed before they are sent to the kitchen.

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In saving seed, the whitest, earliest, and firmest heads should be chosen: and when the head begins to open, a portion of the branches should be thinned out, to give room and more strength to those which are left to mature seed. In the northern counties of England and Scotland, the seeds do not ripen abundantly, unless the plants are placed close to a south wall, and the branched head fastened close up to it by nails and shreds. No seed is easier adulterated than that of the cauliflower, if any other congenerous plant be near and in flower at the same time. This, however, is a fact so well known that it can hardly be forgotten by the seed-grower.

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BY H. C.

IN Number XLIII. of the *Horticultural Register*, I observe in a communication by Mr. William Grey, he seems to think the trees under Mr. Eaton's care are not benefited by the covering he has adopted. I think, on the contrary, that they are of great use; for while the wall-trees at most places round here are in a sad state of blight, his have the most healthy appearance; are neither blighted, mildewed, or cankered; they have had the same treatment they used to have previously to his having the curtain; and many of them are growing in the same soil that those did which died in the cankered state he mentions in his communication.

Being a young gardener, and wishing for information, I should be obliged to Mr. Grey, or any other correspondent, if they will inform me, through the medium of the *Register*, what it is that causes the marked difference in his trees, if it be not the covering?

In the place I am now living at, we have adopted the same sort of covering for some tender exotics, which we planted against the open wall last autumn; but not having much frost last winter, with the exception of a night or two (the thermometer indicated 14° of frost on the 20th of January), I am unable to say if they will afford that protection which they require.

I am sorry to see you discontinue the account of new plants figured in the different periodicals: I hope you will resume the account, as many besides myself consider it one of the most useful portions of the *Horticultural Register*.

H C.

*Dorset, June 20, 1835.*

## ON THE MILDEW OF PLANTS.

BY THE AUTHOR OF THE DOMESTIC GARDENER'S MANUAL, C. M. H. S.

My opinion has been requested on the following subject, and the queries which are annexed:—

“It has been long ago discovered, that strong *soap-lather* applied to the leaves or shoots of plants infected with the fungus called mildew, destroys that parasite, and restores the plant.

“Query 1. Which quality of the soap is it that is thus effectual? and—

“Query 2. Would a solution of soda in pure water answer the same purpose of the gardener?”

I have bent my attention to this important subject; and only regret that to the present time, and ever since the inquiry was made, I have had no satisfactory means at hand to afford a fully practical demonstration of the efficacy of the chemical agents which are particularly mentioned. Last year, a very fine bed of the damask rose was so completely infested with the fungus, that the leaves curled up, thickened, assumed an appearance as if they had been coated with starch, and in all respects were totally changed. Had I at this time such an opportunity afforded me, I could ere now have arrived at something like a definite conclusion. I however destroyed my bed, transplanted my bushes in October, and find that scarcely one in ten has survived. The only specimens of mildew which I have met with during the late spring have been seen on the terminations of two or three laterals upon my espalier apple-trees; and these, I have reason to think, were produced by the sudden and powerful heat which set in about the first week of the present month. On these affected shoots, I have performed several experiments, and shall, in a few words, describe the agents I have made use of. Before I do this, however, I must observe, that although I have not as yet assured myself of a certain curative remedy, I have discovered an active agent, which, while it confirms one of Mr. Main's assertions, leads to a reply to the second query. If, for want of data, I cannot practically answer the questions which apply to the curative agency of soap, I am enabled to present to the reader who may take interest in the proposed subject, certain facts upon which he may rely, and on them found a series of experiments which may lead to satisfactory results.

The *chemical composition of soap* requires our first notice.

Common soap is composed of *soda* and *fatty* substances, as those of tallow, grease, oil, and the like: it varies in colour, consistence, and odour, according to the nature and condition of the materials employed. I do not mean to speak of the *manufactory* of soap; that would involve an inquiry irrelevant to the subject; but simply to furnish a general idea of the ingredients of which soap is composed. The *soda* or *mineral alkali* made use of by the soap-boiler, is not however that article which is sold by the druggist; it is a liquid in a caustic state, that is to say, it is soda deprived of the carbonic acid (which renders it mild) by the agency of a certain quantity of quick-lime. Let any curious reader take half an ounce of common crystals of soda: on applying his tongue



to one of them, the taste may be found saline and disagreeable, but no unpleasant effect will be produced on the tongue. Then let him powder and dissolve it in as much boiling water as will, stirring with a tea-spoon, render it fluid. To this solution—kept boiling hot—let a tea-spoonful or two of powdered quick-lime be added; and in a very few seconds a change will be perceptible; for, on applying the *minutest* drop to the tongue, a burning pungency will be discovered. In fact, were the process carried on till all the neutralising carbonic acid were taken from the soda by the lime, the skin of the tongue would be destroyed, and a wound created by any incautious application of the liquid. Things being in this state, let a little sweet (olive) or other oil be poured into a phial with an equal quantity of soft water, then add a few drops of the caustic soda liquor, and agitate the contents of the phial. If due proportions be employed, an *emulsion*, as it used to be termed, will be formed; but, chemically speaking, soap will be produced by the union of the caustic soda with the oil, though it will be in a fluid state, being held in solution by water.

Now, in testing the efficacy of soap in the cure of mildew, the foregoing and other processes should be performed; and I shall shortly show that thereby the questions I proposed may be completely solved. *Soft soap*, the substance chiefly employed and recommended by gardeners, is not a combination of soda and greasy matter: in the preparation of this useful material, caustic *potash* is substituted for *soda*; and they who are so inclined, may operate with these two materials in the manner above recommended—that is to say, mild potash (called *carbonate of potassa*) may be tried in solution upon diseased leaves: this solution may be deprived of the neutralising acid, and rendered caustic by the addition of quick-lime, and then it will combine with oily substances.

Thus I have collected together materials for a course of experiments, and it remains to mention how far I myself have been able to proceed. I stated at the commencement of this article, that I had discovered the mildew upon one or two solitary laterals of apple-trees: to these I applied chemical agents thus prepared. One ounce of the crystals of soda was dissolved in seven fluid ounces of water: the taste of this liquor was far from potent: I plunged the diseased twig into it over night, but did not leave it immersed for one minute. On the following morning every leaf was found killed, and of the colour of rust of iron. I rendered the solution slightly caustic by the addition of a few small pieces of very inert lime, not using any heat. The taste became slightly pungent; and I then diluted one fluid ounce with three ounces of rain water. Another twig was tested in a similar manner with the

former, and on the following morning each leaf was perceived to be killed, and rendered brown. Thus it is apparent that either carbonate of soda, or the pure *alkali* in a very diluted state, will destroy *leaves entirely* ! Whether the latent buds on the twigs will sprout or not, is a point to be ascertained.

A *liquid sulphuret of lime*, made by boiling an ounce of sulphur in a gallon of water, and adding to the hot fluid about twice the quantity (two ounces) of lime, being used cold, did not injure apple leaves ; but it has not yet appeared certain that the mildew will yield to it. I may here remark that this solution is of a yellowish colour, of a powerful taste, and sufficiently strong for many purposes : it cannot be used with safety to melon plants ; but I believe it to be very efficacious where the vine is infested with the red spider, or the pine with the crocus. If a tea-spoonful of Gallipoli, linseed, or train oil, be put into a phial with one or two tea-spoonfuls of soft water, and as much *caustic soda* liquor be added as will combine with it in the form of a white (soapy) emulsion, a plant may be anointed (rose, apple, pea, bean, strawberry, and what not) without material injury : a spottiness, however, will be created, and in the instance of the pea leaf, that peculiar glaucous marbling, which, I think, originates in an insect—as I have found one under the epidermis of the lower side, under those marks—appear to be affected by the fluid, and to become discoloured. Oil alone, in fact, will affect a leaf, and produce discoloration ; it will also, *beyond a DOUBT*, destroy the mosses and lichens upon the stems of fruit trees, as I have proved and witnessed in the Isle of Thanet, where the dwarf standards are often kept clean by train oil. But the application of this substance is not advisable upon foliage, as the pores (*stomata*) of leaves must thereby be greatly clogged.

After all that I have observed, I arrive at the conclusion, that oil or soda—the chemical ingredients of soap—are efficient applications, in as much as they may destroy a fungus, but that they are each improper agents, and cannot be used with safety to a plant ; that the chemical compound termed *soap*, is one wherein the peculiar qualities of each ingredient is electro-chemically neutralised by the energy of each acting the one upon the other ; and that *soap*, the product, is the only form in which soda, potassa, or oil, can prudently be applied to the leaves of plants.

I repeat, that my experience does not now furnish data whereon to found a strictly philosophical hypothesis ; but that if the experience of the gardener have *satisfactorily proved* that *soap-lather* destroys the *uredo* or other mildew fungus,—I hold it to be beyond *question* or *doubt*, from actual proof, that the remedy *exists in*, and is solely to be

traced to the *chemical union* of the TWO INGREDIENTS. I think it, however, a duty to pursue experiments ; and, if I find opportunity, I shall test every mildewed subject that may fall under my notice, and note the results very particularly.

T.

*July 1, 1835.*

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ON THE GERMINATION OF SEEDS.

BY W. M.

THE germination of seeds having excited some interest in former numbers of the Register, I was pleased to find the Author of the Domestic Gardener's Manual express that he was prepared to fully investigate the subject, which he endeavoured to elucidate by experiments with seeds under glass. So far they may be conclusive, as by being so placed they have confined with them the moisture from the earth, which having a natural tendency to ascend and disperse in the atmosphere, is by such means prevented and turned to account in accelerating their germination ; also in striking cuttings ; the same method is found to be almost indispensable as regards many plants. I would also remark that the common glass used for horticultural purposes always presents an unequal surface, refracting or reflecting the rays of light in various ways, thereby decomposing it, and rendering it very different from any light of nature ; whereas seeds placed on the natural ground, and left entirely to nature, even should a favourable shower or two cause them to protrude forth the rudiment of a root, the smallest degree of wind or sun would immediately destroy the vital principle, as every horticulturist is aware that plants which have been kept in a confined and rarefied atmosphere, require to be hardened very gradually before they may be safely placed in contact with the free light and air. Hoping these remarks will lead to further investigation, I shall be happy to hear the results in some future number.

W. M.

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LANDSCAPE GARDENING.

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LETTER SECOND.

HAVING promised to give you in detail full descriptions of every principal feature of this interesting country seat, I seize a leisure hour

to revert to the approach over which I passed so rapidly yesterday, and which consequently was passed without making such remarks as were requisite thereon. Nor could I have then been able to describe it as it really is, without the information which I now possess, as conveyed to me by my good friend in conversation last night.

The London gate, or principal entrance to the house, was placed where it is, because the turnpike road, which passes through a part of the estate, makes, in that place, the nearest appulse to the mansion. Another thing, that particular spot was chosen because it lies considerably lower than the site of the house, and thereby allowed a *gently rising line* to be fixed on for the carriage road, which is always a desirable circumstance in approaching a mansion. The architecture of the lodge partakes intentionally of that of the house, though in a properly subdued degree. Nothing can be more preposterous than a splendid entrance-gate to a mansion of less decorated character. The first seems contrived to please or astonish the high-road passenger, or to raise high expectations in the mind of a visiter, only the more keenly to disappoint him on his arrival at, perhaps, a plain brick building of no high architectural pretension. Such discrepancy has been tastefully avoided at this place. A single comfortable lodge for the gate-keeper was also preferred to a *pair of lodges* for one family: a useless sacrifice to the love of symmetry, most unnecessarily, if not absurdly erected at many country seats, and even villas, in this kingdom. Such erections only gave cause for the current taunt that so and so's lodges were like tea-canisters, "green and bohea," as well in form as in diminutive size. The presence of hardy exotic trees as an accompaniment to the lodge, is also quite appropriate, inasmuch as it is a "recognition of art;" that is, an inferred acknowledgment that the park has been enclosed and embellished by labour; and that all the dispositions within have been or are the results of study and design. This becomes more and more apparent as we proceed. The line of the carriage road is one of those dispositions, and does not deviate much from a right line drawn from the outer gate to that of the court-yard. It certainly appears to trend away to the right at the point where we first see the house; but it is not more than what a skilful coachman would choose to take in order to set down at the north portico. Had it been carried more to the right, it would have passed through some beautiful woods, and over some fine verdant lawns; but it would have been unnecessarily lengthened. Had it swept boldly down into the valley on the left, it would have had two dreaded inconveniences, viz. descending one eminence, merely for the sake of ascending another. Besides, a carriage road along a valley cannot be sufficiently concealed;

it divides that which is most beautiful as a whole; and moreover occasions the planting of clumps of trees to hide the road from the windows perhaps, and thereby fills up the valley, a circumstance particularly to be avoided.

But the good taste of the proprietor chose a middle course, which has many advantages; it is led along the brow of the valley or upon the edge of what may be called the table-land. This prevents it being seen when looking across it from any other part of the park. The ground is necessarily firm and dry; nor does it receive any surface drainage from higher land. Neither is it so exactly *hanging-levelled* as to be entirely free from gentle undulations longitudinally; these assist to keep the surface dry in wet weather, by carrying the water to the dips, where gratings over drains are laid to receive the flow.

The views into and over the valley on the left, as mentioned in my first letter, and also those to the right, are too interesting to allow the visiter to feel any thing like tedium while on the long sweep from the gate to the house; and the open groves and thickets which so frequently occur along the line, yield as much variety of light and shade as any lover of woodland scenery could wish. A few chairs for the pedestrian, and a *para-shower* hovel fenced from cattle, are placed on the side of the road, and benches round shady trees, are seen in many situations.

My friend described his method of constructing his roads, which is, as near as I can recollect, as follows:—the line is first staked and marked out on the surface nine feet wide; the bed of the road is next excavated to the depth of one foot, the soil being wheeled or carted out and spread, or laid in hollows on each side. The depth of the bed varies according to the nature of the soil: a firm bottom must be found; because it is of no use to lay hard metal on a bog or wet clayey bottom, which would soon swallow it up. But the subsoil of this country is generally a gravel, so that there is not much difficulty in gaining a sound bottom for a road, or procuring from pits excellent materials or metal for making it. In forming the bed the quality or condition of the earth thrown out, will clearly indicate whether any one spot more than another be liable to flooding, or retentive of water after heavy rains, or from land springs. If such occur, a transverse drain is cut across the road one foot deeper than the bed and filled with pebbles; and which, if it be in a dip, will always serve to swallow any water that may collect at that point. When the bed is thus prepared, it is half filled with stones picked off the land for the purpose, or with the coarsest of the gravel from the pits. This foundation is levelled and laid in as compactly together as possible. On this there is next laid a coat of

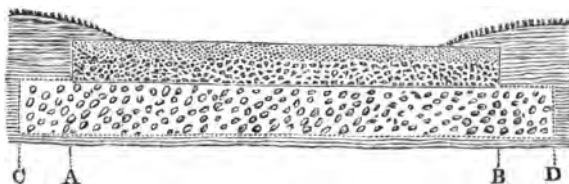
screened gravel, four inches thick, well levelled and trodden firmly down ; and at last about one inch of the finest gravel which passes the screen, all which layers or coats are laid somewhat rounding, that is about two inches higher along the middle. If the two last coats be laid on in that *moist state* in which the gravel is digged from the pit, the whole will bind down into a solid unyielding body, and remain ever after smooth, dry and firm, which are the great properties of a carriage road, and which can only be obtained at the first formation ; for if the gravel of the two last coats be allowed to be thoroughly dried by the sun and wind, it will remain loose for a long time, nor will it bind until it has been repeatedly rolled after rain.

The body of gravel is made much wider than is necessary for wheel carriages, because seven feet are quite enough for these ; but as most roads become uneven and broken up by the lateral pressure of carriages, the gravel is laid a foot farther out on each side to resist, like a buttress, this pressure.

The surface of the road is rather below the turf on each side, because nothing looks worse than a long yellow line intersecting the lawn. Neither is the gravel much raised in the middle ; for wheels running on inclined planes, as the sides in such case must be, they have a grinding action destructive of the smoothness of the road. The edges of the turf are not kept as exactly cut conspicuously hard lines, being allowed to "die off" upon the gravel, and without furrow or gutter at the sides. Neither are there quarters or ruts ; the space of seven feet along the middle being kept clean by the repair of horses and wheels, so that there is very little labour for the weeder. As little sinkings will happen under the wheels for some months after the road is made, they are filled with very fine hard gravel from time to time till the whole is of uniform compactness.

You may imagine perhaps that the width is not sufficient to allow carriages to pass each other. This is perfectly true ; but when it is considered that the turf on each side is so firm as to bear any horse or carriage, no inconvenience or destruction of the grass can take place by turning out ; and especially as such meetings, on a strictly private road, can but seldom happen. Besides, a gravel road wide enough for carriages to pass each other, would require a surface of at least ten feet,—would necessarily occasion a heavy expense to make such a road at first,—it would also destroy a large piece of pasture, and, what is worse than all, would require to be kept at all times free from weeds ; which if it were not, would be a reproach to the proprietor every time he passed along it.

In order that you may have a better idea of the construction of the road, I add a sketch of a transverse section of it.



General width of the road from A to B nine feet. A cross drain under the road from C to D one foot deeper than the bed of the road.

This is the mode of forming carriage roads on the Fairfax Hall estate, and which has been executed by the present proprietor and his forefathers for very many years past. It is on the M'Adam principle; but it was practised here long before that celebrated projector was born; and over his method (as practised upon some of the turnpike roads) it has one advantage, namely, no part of the surface is ever intended to be longitudinally level; because a dead level remains much longer wet after rain, and much more liable to wear into holes, than an ever-so-slightly undulating surface.

While noticing the carriage road, I may as well, at the same time, state how the gravel walks are made and kept in the garden, as described to me by the gardener himself since I began this letter.

The kitchen garden is a parallelogram sloping easily towards the south. The walks run in the same direction as the walls, and are made to partake of the general inclination of the surface. As the roots of fruit trees extend themselves to considerable distances horizontally, it is right they should meet with no obstruction in passing under the walks; and therefore, instead of making the walks upon deep trenches, filled with all sorts of rubbish digged or raked up in the garden when it was made, as used to be the old custom, they are formed on the general surface, in an excavation no deeper than about eight or nine inches. This excavation is levelled and rendered very firm at bottom, and covered with about an inch of pure pit sand, and afterwards with gravel, to the required height. The gravel used for this purpose is what is called *run gravel*; as it is digged from the pit, it is thrown together in a conical heap, the coarsest parts and largest pebbles running off to the base, whence they are every now-and-then raked away. This method of preparing the gravel renders it very uniform in consistence; and when laid, levelled, and put in form by the spade, and immediately trodden across and lengthways with the feet, to show and fill up the

hollows, and afterwards rolled smooth, it forms an excellent walk. The walks in the pleasure ground are formed in the same manner, and kept neat by weeding, sweeping, and frequent rolling, especially after rain. These walks are never ridged up in the winter, as used to be a most ridiculous custom, but they are turned every year soon as the spring cropping, digging, and pruning is over. A gang of men is employed to do this as it ought to be. The utmost despatch is necessary ; because if the gravel gets dry between the time it is raised and trod down again, it will not bind so well as it should do. Two men with mattocks move the gravel to the depth of about six inches ; two others with spades follow close, turning and laying it in form, and keeping up with them comes the treader, crossing forwards and backwards, finding out every hollow, which with the back of a little rake he fills from the higher parts ; and close at his heels another man, with a light garden roller, traverses repeatedly, and finishing the work in as neat and sound a condition, and as pleasant to walk upon, as before the workmen began. The toothed side of a rake is never used in this business : the custom of raking the largest of the pebbles into the opening before the diggers is bad, as it is sure to cause the appearance of ridges across the walk sooner or later ; and besides, the rake leaves too much of the finest of the gravel upon the surface.

Your's as always,

A. B.

31st May, 1835.

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NOTICES OF BOOKS ON GARDENING, &c.

*An Inquiry into the Causes of the Fruitfulness and Barrenness of Plants and Trees, with practical Instructions for the Management of Gardens and Farms, and a System of training Fruit Trees, &c., founded on scientific Principles. Arranged as a Dialogue.* By Joseph Hayward, Esq., Author of "The Science of Horticulture," "The Science of Agriculture," &c. Orr and Smith, Amen Corner, Paternoster Row, 1835.

This book is the production of a gentleman who has long made gardening and farming his study ; and as he is also well acquainted with the science of chemistry, it is in his power to look into and account for many phenomena which are not understood by practical men. On this account the book is well worth the attention of all those who to their practical knowledge wish to add as much of the science as will enable them to improve their practice on rational principles, and satisfy their



own minds as to the cause of many circumstances which occur in the prosecution of their business.

The author has fully explained his own peculiar practical methods of pruning and training fruit trees, with engraved illustrations of the same. This part of the book is interesting, especially to young hands, who ought to store their minds with every thing said or written on so important a part of gardening. No book ever written on the subject but contains something worthy of acceptance; and that now before us certainly deserves a place in every horticultural library. As proof of the author's sincerity, and fearlessness of having his trees examined by practical men, he says in an advertisement bound up with the book, that as regards his "plans of training (which some practical gardeners have been pleased to consider altogether speculative), I shall be happy to afford to any one who will do me the favour of inspecting my garden the most satisfactory evidence of their feasibility; the illustrative figures being, in fact, almost all sketched from trees now in a course of training by myself."

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NOTICES OF PLANTS FIGURED AND DESCRIBED IN THE FOLLOWING  
BOTANICAL PERIODICALS FOR JULY, 1835.

EDWARDS'S BOTANICAL REGISTER, continued by Dr. Lindley, contains—

1. *Pæonia Moutan: lacera*. Double red curled Tree Peony: a seedling variety raised by Mr. W. Hyland, gardener to the Earl of Sandwich, at Hinchinbrook.

2. *Angræcum micranthum*. Small-flowered angræcum. A diminutive genus belonging to orchidææ, introduced by Messrs. Loddiges, from Sierra Leone.

3. *Russelia juncea*. Rushy Russelia: a green-house or stove plant, having very slender branches, three feet high, but almost leafless. It however bears handsome tubular scarlet flowers, making it very conspicuous.

4. *Eriogonum compositum*. Compound Eriogonum. A hardy herbaceous plant, found by the late Mr. Douglas, on the gravelly banks of rivers in New Albion.

5. *Clianthus puniceus*. Crimson glory pea. A new and beautiful plant, received from New Zealand, and expected to be as hardy as the *Edwardsia microphylla*.

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## REMARKS ON THE WEATHER.

DURING the first five days of the present month we had variable weather, with harsh, sometimes cold and chilly wind from the east or northward. On the sixth it set in dry and remarkably warm, and continues pretty regularly so nearly up to the present time, though not without some of those sudden changes of temperature which are so often experienced in this climate. On one occasion the thermometer varied from 82° to 52° in the course of twenty-four hours. There have been some thunder storms in different parts of the kingdom, which being accompanied with hail, have caused some damage to both field and garden crops in Cambridgeshire and other places.

Vegetation, assisted by the previous fine rains, and prompted by the high temperature which followed, came on rapidly. Peas and other culinary crops were quickly plentiful. Strawberries and cherries are already abundant in the London market, the latter not half ripe, by the bye ; but such is the avidity with which everything fresh or *new* is bought up, that much money is made of both young fruit, cherries and gooseberries ; and vegetables, as potatoes, for instance, in a state in which they can scarcely be considered either palatable or wholesome.

The aphids has been, as usual, prevalent, especially on sickly wall trees, on hops and other plants, and have required much laborious attention to free peach and nectarine trees from their attack. Orchard fruit appears to be everywhere plentiful.

For the last three days we have had abundant rain, with the wind at south-west.

*June 27, 1835.*

PAXTON'S  
HORTICULTURAL REGISTER,  
AUGUST, 1835.

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HORTICULTURE.

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ON THE CULTIVATION OF THE CAULIFLOWER.

IN our last number we had occasion to make some remarks on the physical constitution of that variety of the cabbage called cauliflower ; and, as we then promised, now proceed to detail the ordinary modes of culture, together with some account of the means and manner of accelerating the growth and early production of this favourite vegetable, as practised long ago by ourselves and others. This, in the estimation of many readers, will be considered of ten times more importance than any descant of abstract notions relative to the physiology of the plant. The one is certainly more immediately useful than the other ; but both are necessary to the man who wishes to obtain a thorough insight into the nature of this, or any other object of his care.

In taking up the pen with this view we cannot forget that we wrote five or six years ago, for the *Gardener's Magazine*, a short paper on the same subject, which was published in that periodical, and thence into several other books ; so that what we are now about to advance cannot be called original matter. But, as it is probable many young readers of the *Register* may not have seen that paper, there can be no harm, on their account, to give a new version of it. Advice, if good, can hardly be too often repeated ; and practical rules, if of any use, cannot be too often inculcated.

No practical man can be ignorant that the proper time for sowing cauliflower seed for the earliest spring crop is on, or about, the twenty-

fourth of August. It is, however, better to sow twice about that time; say on the twenty-first, and again on the twenty-eighth. If the seed be sown sooner than the twentieth, the plants are likely to produce flowers too soon and of too small a size for use; and if not sown till after the end of the month, the flowers are not produced so soon in the following season as if the seeds were sown a week earlier.

A dry lying sunny border of rich light soil is most suitable for a seed-bed. This should be dug and made fine by the spade; sow regularly, and not too thick, in order that the seedlings may be drawn with more safety when they are large enough to be pricked out into nursery-beds. The seeds being very small only require pressing into the soil with the teeth of a rake, and afterwards raking level. When the seedlings appear protect them from birds and slugs; and if the weather be dry give water to bring them forward.

Towards the latter end of September, the young plants will be fit to handle; a bed, being of like quality and having a similar aspect, should be chosen and got ready to receive the seedlings. The strongest, soundest, and most perfect plants are raised carefully from the seed-bed, and pricked into the nursing bed, in rows four inches apart and the same distances between plant and plant. If it be necessary to prick out a considerable number, the ground should be divided into beds three feet wide with one-foot alleys between; this is for the purpose of placing hoops over the beds to bear coverings of mats in severe weather. This is particularly necessary where there is not the convenience of glazed frames, or hand-glasses; as when these may be had the plants are at once pricked out into them and covered by the lights, when the plants require such protection. In using a frame for a nursing-bed, the soil within should be raised so that the plants be kept as near the glass as possible; otherwise they are liable to be too much drawn in the stems. And, in that situation, require at all times full air and light to render them sufficiently hardy to withstand the frosts of winter. In giving protection against frosts, however, care must be taken not to give it *unnecessarily*; because the plants become so tender under coverings that the least accidental exposure destroys them.

The sooner cauliflower-plants are pricked out into nursery-beds, the stronger they become during the winter; and of course, in fine condition to take their final stations in the spring; but, it has been found that these do not resist frost so well as if they had stood in the seed-bed till November, and then pricked out. The reason is this, those set out in September are in a state of active growth when frost usually sets in, and are consequently more easily hurt; whereas those pricked

out in November are inactive, in consequence of the check received in removal, and therefore less likely to suffer from frost.

Protecting cauliflower plants under bell or hand glasses, is one of the most common expedients in kitchen gardening, and is executed as follows, viz.:—a border, on the end or side of a compartment in the open garden, is prepared by having a good coat of rich dung deeply dug in. The ground is divided into four feet-wide-beds, with two-feet-wide alleys between. Along the middle of the bed, or beds, a rank of hand-glasses is placed, by line, two feet apart from each other. Within the impressions made by the bottoms of the glasses, four or six of the best and healthiest plants are drawn from the seed or nursing-bed, and dibbed or let in with a trowel. Three or four of these plants are intended to perfect their heads on the spot; the supernumeraries to be transplanted to some other place in the spring. When the planting is finished a little water may be given to each to settle the earth about their roots, especially if the soil, or weather, be dry, as sometimes happens in the month of October, the proper season for the performance of this work. The glasses are then put on for the winter, but, on the morning of every fine day, the south fronts of the glasses are raised on a brick-bat to admit fresh air, but shut down close again at night.

This is the only protection and attention required by the plants throughout the winter, except, perhaps, taking the glasses entirely off in the middle of a mild day, stirring up the surface of the earth among the plants, and taking away dead or dying leaves, and replacing the glasses before night. Attention should also be given that no snails or slugs take up their winter quarters within the glasses, because these would assuredly injure the plants one way or other. If any enemy of the kind appear, a dusting of hot lime, or a sprinkling of lime-water, will kill or drive them away.

The plants so treated will, during the month of March, be advancing rapidly, and about the beginning of April will have filled the glasses with their leaves. When this takes place the supernumeraries must be removed, and those that remain well earthed up, at the same time forming a kind of basin round the stems to hold water, copious supplies of which will be required occasionally, if the season be dry. At this time also, the glasses are raised all round, by being set on three or four brick-bats, to give head-room, till about the beginning of May, when they may be entirely laid aside.

Cauliflower plants cultivated in this way are the first ready for table, and very often come in too much together for private use, too many hand-glasses, therefore, need not be employed; for those plants which have stood, perhaps, exposed to the open air all winter unscathed, will

come in for use very shortly after those in hand-glasses. The progress of the plants depends greatly on the mildness or severity of the winter ; if not very severe, whether under protection or not, the plants are advanced accordingly ; but in extremely hard frost every exposed plant is liable to be cut off.

Early cauliflowers are one of the principal delicacies of the season, and the earlier they can be had for table the more they are valued. No wonder then that practical men have employed their skill and attention in accelerating the growth of the plant. In places where a high style of gardening is carried on, and where there are forcing-houses of different descriptions, another method of obtaining an early crop is had recourse to, and, when carefully conducted, with very great success. As soon as the seedlings have got two or three leaves, they are raised from the seed-bed and planted in sixty-sized pots, filled with very rich compost. When potted they are watered, and plunged in the earth of a cold frame, prepared to receive them, and pretty near the glass. They must have fresh air daily by raising the lights at the back, and kept duly watered. As soon as the roots have reached the outside of the ball of earth, they must be immediately shifted into forty-eight-sized pots, in similar compost, watered, and replunged again into the frame. In another month the plants will require thirty-two-sized pots, afterwards twenty-fours, and, ultimately, about the first of March, sixteens. When fairly established in these last pots, say about the first of April, they are removed from the frame into a peach-house or vinery, and placed along the front platform of the house in pans of water. Here they should have as much fresh air as can be allowed them, and carefully supplied with water ; for if in any stage of their growth, more especially after being taken into the house, the roots at any time become dry, the plants immediately "button."

About the middle of April they may be taken out of the house and turned out of the pots into pits made to receive them, either upon a south border, or in the alleys between asparagus beds. In these places they should be pitted four inches below the common surface of the ground, and have the earth drawn to their stems to keep them steady. Should frosty nights occur after they are out, a few fir-boughs, stuck round and so as to lean over them, will be a sufficient defence.

- Cauliflowers managed in this way generally produce fine heads about the first of May ; but it will readily occur to practical men that they may be made to yield flowers even earlier than this date, *if moderate*, instead of *full-sized*, heads would suffice ; because stinting them of water for the last week they are in the house would certainly advance their flowering by a week or ten days.




This method of cultivating cauliflowers is not practised so much, perhaps, as it deserves to be. Like all other schemes of forcing culinary vegetables, it is attended with some labour, and consequent expense ; but the gratification of partaking of such a delicacy ten days or a fortnight before the ordinary season, would be considered by very many a high treat.

The flowering of full grown plants may be hastened, it seems, by quite a novel proceeding, discovered or recommended, we think, by a correspondent of the "Irish Farmer's and Gardener's Magazine." If the stem of a cauliflower plant, which is nearly full-grown, be nearly cut through near the ground, and be supported by a stake or stakes to prevent it being entirely broken off, the flower will come forth sooner than if the stem had not been wounded at all. This, by the bye, is quite a natural consequence, because the growth of the exterior members being stopped, the remaining vitality being central is exerted against the flower and which is thereby forced forth alone. Thus we often see plants of the same genus with the cauliflower, when cut over and thrown upon the bare ground, or rubbish-heap, perfect their flowers without any assistance from roots.

A few more observations may be added relative to potted cauliflowers : —We have already observed that they must never be allowed to become dry at the root, until the heads are required for use ; and while in the frame be defended from snails and slugs, which are sometimes a great annoyance. Air must be given as often as it can be done with safety ; and in very hard frosts the frame should be covered with a mat at night. Much attention is required to hit the right time for shifting, for if once the roots become matted round the pot, there is great risk of the plant "buttoning."

The foregoing observations relate to what may be called the superior methods of cultivating cauliflowers ; but they may be cultivated without the assistance of either glass or hothouses, and with no further trouble than protecting the plants from severe frost during winter. With this view the seedlings are pricked out upon a warm dry border and hooped over, as already mentioned ; and being covered in hard frost, they are preserved till about the middle of March, when they may be planted out for good. A sheltered, rich spot of ground is always chosen, dunged, and well-dugged ; the plants are dibbed in by line two feet asunder every way, and afterwards kept clean and earthed up by the hoe. These plants yield their heads about the beginning of June, sooner or later, according to the favourableness of the spring months.

The above are called the spring crop ; but in order to have a succession of flowers through the summer, two sowings must be made in the



spring. The first should be raised on a little heat, or under hand-glasses, close to a south wall, in the month of February, and afterwards pricked out in a cold frame, to be nursed till they are of sufficient size, and until the season serves for planting them out for good. These, with some of the underlings of the autumn sowings, will come in after the spring crop. The second sowing is made about the twenty-fifth of April. These are commonly called Michaelmas cauliflowers, and come in about that holiday; and last till the frost destroys them. But as many flowers are in prime order in November, when sharp frosts may be expected, it is usual to secure all the best by digging them up, trimming off the greater part of the outside leaves, and hanging them by the heels in a warm shed or dry cellar, or stowing them upright and close together in dry earth in a spare hotbed frame, or pit, where they may be safe from frost and damp. In this way cauliflowers may be kept good, very often till February. Some writers advise the heads intended to be stored in winter, to be buried in tubs, or boxes, of pure peat-earth; that is, such as is as free from sand or other earthy particles as possible—the antiseptic qualities of which preserve the heads good for a long time, if kept excluded from air. They, however, require to be thoroughly washed before they are sent to the kitchen.

There are two varieties of cauliflower in cultivation, namely, the early and the late. The first is the most delicate, the second somewhat more hardy. Both require similar treatment, and both arrive at the greatest size in the richest soil. At genteel tables the flowers are considered in the greatest perfection when they measure about three or four inches over; because then they are both very firm, and delicately white. But a much larger size is required in French cookery, when a whole single flower is intended to form an entire and principal dish.

In saving seed, the whitest, earliest, and firmest heads should be chosen: and when the head begins to open, a portion of the branches should be thinned out, to give room and more strength to those which are left to mature seed. In the northern counties of England and Scotland, the seeds do not ripen abundantly, unless the plants are placed close to a south wall, and the branched head fastened close up to it by nails and shreds. No seed is easier adulterated than that of the cauliflower, if any other congenerous plant be near and in flower at the same time. This, however, is a fact so well known that it can hardly be forgotten by the seed-grower.

## ON COVERING FRUIT TREES.

BY H. C.

IN Number XLIII. of the *Horticultural Register*, I observe in a communication by Mr. William Grey, he seems to think the trees under Mr. Eaton's care are not benefited by the covering he has adopted. I think, on the contrary, that they are of great use; for while the wall-trees at most places round here are in a sad state of blight, his have the most healthy appearance; are neither blighted, mildewed, or cankered; they have had the same treatment they used to have previously to his having the curtain; and many of them are growing in the same soil that those did which died in the cankered state he mentions in his communication.

Being a young gardener, and wishing for information, I should be obliged to Mr. Grey, or any other correspondent, if they will inform me, through the medium of the *Register*, what it is that causes the marked difference in his trees, if it be not the covering?

In the place I am now living at, we have adopted the same sort of covering for some tender exotics, which we planted against the open wall last autumn; but not having much frost last winter, with the exception of a night or two (the thermometer indicated  $14^{\circ}$  of frost on the 20th of January), I am unable to say if they will afford that protection which they require.

I am sorry to see you discontinue the account of new plants figured in the different periodicals: I hope you will resume the account, as many besides myself consider it one of the most useful portions of the *Horticultural Register*.

H C.

*Dorset, June 20, 1835.*

## ON THE MILDEW OF PLANTS.

BY THE AUTHOR OF THE DOMESTIC GARDENER'S MANUAL, C. M. H. S.

My opinion has been requested on the following subject, and the queries which are annexed:—

“It has been long ago discovered, that strong *soap-lather* applied to the leaves or shoots of plants infected with the fungus called mildew, destroys that parasite, and restores the plant.

“Query 1. Which quality of the soap is it that is thus effectual? and—

“Query 2. Would a solution of soda in pure water answer the same purpose of the gardener?”

I have bent my attention to this important subject; and only regret that to the present time, and ever since the inquiry was made, I have had no satisfactory means at hand to afford a fully practical demonstration of the efficacy of the chemical agents which are particularly mentioned. Last year, a very fine bed of the damask rose was so completely infested with the fungus, that the leaves curled up, thickened, assumed an appearance as if they had been coated with starch, and in all respects were totally changed. Had I at this time such an opportunity afforded me, I could ere now have arrived at something like a definite conclusion. I however destroyed my bed, transplanted my bushes in October, and find that scarcely one in ten has survived. The only specimens of mildew which I have met with during the late spring have been seen on the terminations of two or three laterals upon my espalier apple-trees; and these, I have reason to think, were produced by the sudden and powerful heat which set in about the first week of the present month. On these affected shoots, I have performed several experiments, and shall, in a few words, describe the agents I have made use of. Before I do this, however, I must observe, that although I have not as yet assured myself of a certain curative remedy, I have discovered an active agent, which, while it confirms one of Mr. Main's assertions, leads to a reply to the second query. If, for want of data, I cannot practically answer the questions which apply to the curative agency of soap, I am enabled to present to the reader who may take interest in the proposed subject, certain facts upon which he may rely, and on them found a series of experiments which may lead to satisfactory results.

The *chemical composition of soap* requires our first notice.

Common soap is composed of *soda* and *fatty* substances, as those of tallow, grease, oil, and the like: it varies in colour, consistence, and odour, according to the nature and condition of the materials employed. I do not mean to speak of the *manufactory* of soap; that would involve an inquiry irrelevant to the subject; but simply to furnish a general idea of the ingredients of which soap is composed. The *soda* or *mineral alkali* made use of by the soap-boiler, is not however that article which is sold by the druggist; it is a liquid in a caustic state, that is to say, it is soda deprived of the carbonic acid (which renders it mild) by the agency of a certain quantity of quick-lime. Let any curious reader take half an ounce of common crystals of soda: on applying his tongue

to one of them, the taste may be found saline and disagreeable, but no unpleasant effect will be produced on the tongue. Then let him powder and dissolve it in as much boiling water as will, stirring with a tea-spoon, render it fluid. To this solution—kept boiling hot—let a tea-spoonful or two of powdered quick-lime be added; and in a very few seconds a change will be perceptible; for, on applying the *minutest* drop to the tongue, a burning pungency will be discovered. In fact, were the process carried on till all the neutralising carbonic acid were taken from the soda by the lime, the skin of the tongue would be destroyed, and a wound created by any incautious application of the liquid. Things being in this state, let a little sweet (olive) or other oil be poured into a phial with an equal quantity of soft water, then add a few drops of the caustic soda liquor, and agitate the contents of the phial. If due proportions be employed, an *emulsion*, as it used to be termed, will be formed; but, chemically speaking, soap will be produced by the union of the caustic soda with the oil, though it will be in a fluid state, being held in solution by water.

Now, in testing the efficacy of soap in the cure of mildew, the foregoing and other processes should be performed; and I shall shortly show that thereby the questions I proposed may be completely solved. *Soft soap*, the substance chiefly employed and recommended by gardeners, is not a combination of *soda* and greasy matter: in the preparation of this useful material, caustic *potash* is substituted for *soda*; and they who are so inclined, may operate with these two materials in the manner above recommended—that is to say, mild potash (called *carbonate of potassa*) may be tried in solution upon diseased leaves: this solution may be deprived of the neutralising acid, and rendered caustic by the addition of quick-lime, and then it will combine with oily substances.

Thus I have collected together materials for a course of experiments, and it remains to mention how far I myself have been able to proceed. I stated at the commencement of this article, that I had discovered the mildew upon one or two solitary laterals of apple-trees: to these I applied chemical agents thus prepared. One ounce of the crystals of soda was dissolved in seven fluid ounces of water: the taste of this liquor was far from potent: I plunged the diseased twig into it over night, but did not leave it immersed for one minute. On the following morning every leaf was found killed, and of the colour of rust of iron. I rendered the solution slightly caustic by the addition of a few small pieces of very inert lime, not using any heat. The taste became slightly pungent; and I then diluted one fluid ounce with three ounces of rain water. Another twig was tested in a similar manner with the

former, and on the following morning each leaf was perceived to be killed, and rendered brown. Thus it is apparent that either carbonate of soda, or the pure *alkali* in a very diluted state, will destroy *leaves entirely* ! Whether the latent buds on the twigs will sprout or not, is a point to be ascertained.

A *liquid sulphuret of lime*, made by boiling an ounce of sulphur in a gallon of water, and adding to the hot fluid about twice the quantity (two ounces) of lime, being used cold, did not injure apple leaves ; but it has not yet appeared certain that the mildew will yield to it. I may here remark that this solution is of a yellowish colour, of a powerful taste, and sufficiently strong for many purposes : it cannot be used with safety to melon plants ; but I believe it to be very efficacious where the vine is infested with the red spider, or the pine with the crocus. If a tea-spoonful of Gallipoli, linseed, or train oil, be put into a phial with one or two tea-spoonfuls of soft water, and as much *caustic soda* liquor be added as will combine with it in the form of a white (soapy) emulsion, a plant may be anointed (rose, apple, pea, bean, strawberry, and what not) without material injury : a spottiness, however, will be created, and in the instance of the pea leaf, that peculiar glaucous marbling, which, I think, originates in an insect—as I have found one under the epidermis of the lower side, under those marks—appear to be affected by the fluid, and to become discoloured. Oil alone, in fact, will affect a leaf, and produce discoloration ; it will also, *beyond a DOUBT*, destroy the mosses and lichens upon the stems of fruit trees, as I have proved and witnessed in the Isle of Thanet, where the dwarf standards are often kept clean by train oil. But the application of this substance is not advisable upon foliage, as the pores (*stomata*) of leaves must thereby be greatly clogged.

After all that I have observed, I arrive at the conclusion, that oil or soda—the chemical ingredients of soap—are efficient applications, in as much as they may destroy a fungus, but that they are each improper agents, and cannot be used with safety to a plant ; that the chemical compound termed *soap*, is one wherein the peculiar qualities of each ingredient is electro-chemically neutralised by the energy of each acting the one upon the other ; and that *soap*, the product, is the only form in which soda, potassa, or oil, can prudently be applied to the leaves of plants.

I repeat, that my experience does not now furnish data whereon to found a strictly philosophical hypothesis ; but that if the experience of the gardener have *satisfactorily proved* that *soap-lather* destroys the *uredo* or other mildew fungus,—I hold it to be beyond *question* or *doubt*, from actual proof, that the remedy *exists in*, and is solely to be

traced to the *chemical union* of the TWO INGREDIENTS. I think it, however, a duty to pursue experiments; and, if I find opportunity, I shall test every mildewed subject that may fall under my notice, and note the results very particularly.

T.

July 1, 1835.

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## ON THE GERMINATION OF SEEDS.

BY W. M.

THE germination of seeds having excited some interest in former numbers of the Register, I was pleased to find the Author of the Domestic Gardener's Manual express that he was prepared to fully investigate the subject, which he endeavoured to elucidate by experiments with seeds under glass. So far they may be conclusive, as by being so placed they have confined with them the moisture from the earth, which having a natural tendency to ascend and disperse in the atmosphere, is by such means prevented and turned to account in accelerating their germination; also in striking cuttings; the same method is found to be almost indispensable as regards many plants. I would also remark that the common glass used for horticultural purposes always presents an unequal surface, refracting or reflecting the rays of light in various ways, thereby decomposing it, and rendering it very different from any light of nature; whereas seeds placed on the natural ground, and left entirely to nature, even should a favourable shower or two cause them to protrude forth the rudiment of a root, the smallest degree of wind or sun would immediately destroy the vital principle, as every horticulturist is aware that plants which have been kept in a confined and rarefied atmosphere, require to be hardened very gradually before they may be safely placed in contact with the free light and air. Hoping these remarks will lead to further investigation, I shall be happy to hear the results in some future number.

W. M.

## LANDSCAPE GARDENING.

## LETTER SECOND.

HAVING promised to give you in detail full descriptions of every principal feature of this interesting country seat, I seize a leisure hour

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A dry lying sunny border of rich light soil is most suitable for a seed-bed. This should be dug and made fine by the spade; sow regularly, and not too thick, in order that the seedlings may be drawn with more safety when they are large enough to be pricked out into nursery-beds. The seeds being very small only require pressing into the soil with the teeth of a rake, and afterwards raking level. When the seedlings appear protect them from birds and slugs; and if the weather be dry give water to bring them forward.

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About the middle of April they may be taken out of the house and turned out of the pots into pits made to receive them, either upon a south border, or in the alleys between asparagus beds. In these places they should be pitted four inches below the common surface of the ground, and have the earth drawn to their stems to keep them steady. Should frosty nights occur after they are out, a few fir-boughs, stuck round and so as to lean over them, will be a sufficient defence.

Cauliflowers managed in this way generally produce fine heads about the first of May ; but it will readily occur to practical men that they • may be made to yield flowers even earlier than this date, *if moderate*, instead of *full-sized*, heads would suffice ; because stinting them of water for the last week they are in the house would certainly advance their flowering by a week or ten days.

This method of cultivating cauliflowers is not practised so much, perhaps, as it deserves to be. Like all other schemes of forcing culinary vegetables, it is attended with some labour, and consequent expense ; but the gratification of partaking of such a delicacy ten days or a fortnight before the ordinary season, would be considered by very many a high treat.

The flowering of full grown plants may be hastened, it seems, by quite a novel proceeding, discovered or recommended, we think, by a correspondent of the " Irish Farmer's and Gardener's Magazine." If the stem of a cauliflower plant, which is nearly full-grown, be nearly cut through near the ground, and be supported by a stake or stakes to prevent it being entirely broken off, the flower will come forth sooner than if the stem had not been wounded at all. This, by the bye, is quite a natural consequence, because the growth of the exterior members being stopped, the remaining vitality being central is exerted against the flower and which is thereby forced forth alone. Thus we often see plants of the same genus with the cauliflower, when cut over and thrown upon the bare ground, or rubbish-heap, perfect their flowers without any assistance from roots.

A few more observations may be added relative to potted cauliflowers : —We have already observed that they must never be allowed to become dry at the root, until the heads are required for use ; and while in the frame be defended from snails and slugs, which are sometimes a great annoyance. Air must be given as often as it can be done with safety ; and in very hard frosts the frame should be covered with a mat at night. Much attention is required to hit the right time for shifting, for if once the roots become matted round the pot, there is great risk of the plant " buttoning."

The foregoing observations relate to what may be called the superior methods of cultivating cauliflowers ; but they may be cultivated without the assistance of either glass or hothouses, and with no further trouble than protecting the plants from severe frost during winter. With this view the seedlings are pricked out upon a warm dry border and hooped over, as already mentioned ; and being covered in hard frost, they are preserved till about the middle of March, when they may be planted out for good. A sheltered, rich spot of ground is always chosen, dunged, and well-dugged ; the plants are dibbed in by line two feet asunder every way, and afterwards kept clean and earthed up by the hoe. These plants yield their heads about the beginning of June, sooner or later, according to the favourableness of the spring months.

The above are called the spring crop ; but in order to have a succession of flowers through the summer, two sowings must be made in the

spring. The first should be raised on a little heat, or under hand-glasses, close to a south wall, in the month of February, and afterwards pricked out in a cold frame, to be nursed till they are of sufficient size, and until the season serves for planting them out for good. These, with some of the underlings of the autumn sowings, will come in after the spring crop. The second sowing is made about the twenty-fifth of April. These are commonly called Michaelmas cauliflowers, and come in about that holiday; and last till the frost destroys them. But as many flowers are in prime order in November, when sharp frosts may be expected, it is usual to secure all the best by digging them up, trimming off the greater part of the outside leaves, and hanging them by the heels in a warm shed or dry cellar, or stowing them upright and close together in dry earth in a spare hotbed frame, or pit, where they may be safe from frost and damp. In this way cauliflowers may be kept good, very often till February. Some writers advise the heads intended to be stored in winter, to be buried in tubs, or boxes, of pure peat-earth; that is, such as is as free from sand or other earthy particles as possible—the antiseptic qualities of which preserve the heads good for a long time, if kept excluded from air. They, however, require to be thoroughly washed before they are sent to the kitchen.

There are two varieties of cauliflower in cultivation, namely, the early and the late. The first is the most delicate, the second somewhat more hardy. Both require similar treatment, and both arrive at the greatest size in the richest soil. At genteel tables the flowers are considered in the greatest perfection when they measure about three or four inches over; because then they are both very firm, and delicately white. But a much larger size is required in French cookery, when a whole single flower is intended to form an entire and principal dish.

In saving seed, the whitest, earliest, and firmest heads should be chosen: and when the head begins to open, a portion of the branches should be thinned out, to give room and more strength to those which are left to mature seed. In the northern counties of England and Scotland, the seeds do not ripen abundantly, unless the plants are placed close to a south wall, and the branched head fastened close up to it by nails and shreds. No seed is easier adulterated than that of the cauliflower, if any other congenerous plant be near and in flower at the same time. This, however, is a fact so well known that it can hardly be forgotten by the seed-grower.

## ON COVERING FRUIT TREES.

BY H. C.

IN Number XLIII. of the *Horticultural Register*, I observe in a communication by Mr. William Grey, he seems to think the trees under Mr. Eaton's care are not benefited by the covering he has adopted. I think, on the contrary, that they are of great use; for while the wall-trees at most places round here are in a sad state of blight, his have the most healthy appearance; are neither blighted, mildewed, or cankered; they have had the same treatment they used to have previously to his having the curtain; and many of them are growing in the same soil that those did which died in the cankered state he mentions in his communication.

Being a young gardener, and wishing for information, I should be obliged to Mr. Grey, or any other correspondent, if they will inform me, through the medium of the *Register*, what it is that causes the marked difference in his trees, if it be not the covering?

In the place I am now living at, we have adopted the same sort of covering for some tender exotics, which we planted against the open wall last autumn; but not having much frost last winter, with the exception of a night or two (the thermometer indicated 14° of frost on the 20th of January), I am unable to say if they will afford that protection which they require.

I am sorry to see you discontinue the account of new plants figured in the different periodicals: I hope you will resume the account, as many besides myself consider it one of the most useful portions of the *Horticultural Register*.

H C.

Dorset, June 20, 1835.

## ON THE MILDEW OF PLANTS.

BY THE AUTHOR OF THE DOMESTIC GARDENER'S MANUAL, C. M. H. S.

My opinion has been requested on the following subject, and the queries which are annexed:—

“It has been long ago discovered, that strong *soap-lather* applied to the leaves or shoots of plants infected with the fungus called mildew, destroys that parasite, and restores the plant.

"Query 1. Which quality of the soap is it that is thus effectual? and—

"Query 2. Would a solution of soda in pure water answer the same purpose of the gardener?"

I have bent my attention to this important subject; and only regret that to the present time, and ever since the inquiry was made, I have had no satisfactory means at hand to afford a fully practical demonstration of the efficacy of the chemical agents which are particularly mentioned. Last year, a very fine bed of the damask rose was so completely infested with the fungus, that the leaves curled up, thickened, assumed an appearance as if they had been coated with starch, and in all respects were totally changed. Had I at this time such an opportunity afforded me, I could ere now have arrived at something like a definite conclusion. I however destroyed my bed, transplanted my bushes in October, and find that scarcely one in ten has survived. The only specimens of mildew which I have met with during the late spring have been seen on the terminations of two or three laterals upon my espalier apple-trees; and these, I have reason to think, were produced by the sudden and powerful heat which set in about the first week of the present month. On these affected shoots, I have performed several experiments, and shall, in a few words, describe the agents I have made use of. Before I do this, however, I must observe, that although I have not as yet assured myself of a certain curative remedy, I have discovered an active agent, which, while it confirms one of Mr. Main's assertions, leads to a reply to the second query. If, for want of data, I cannot practically answer the questions which apply to the curative agency of soap, I am enabled to present to the reader who may take interest in the proposed subject, certain facts upon which he may rely, and on them found a series of experiments which may lead to satisfactory results.

The *chemical composition of soap* requires our first notice.

Common soap is composed of *soda* and *fatty* substances, as those of tallow, grease, oil, and the like: it varies in colour, consistence, and odour, according to the nature and condition of the materials employed. I do not mean to speak of the *manufactory* of soap; that would involve an inquiry irrelevant to the subject; but simply to furnish a general idea of the ingredients of which soap is composed. The *soda* or *mineral alkali* made use of by the soap-boiler, is not however that article which is sold by the druggist; it is a liquid in a caustic state, that is to say, it is soda deprived of the carbonic acid (which renders it mild) by the agency of a certain quantity of quick-lime. Let any curious reader take half an ounce of common crystals of soda: on applying his tongue

to one of them, the taste may be found saline and disagreeable, but no unpleasant effect will be produced on the tongue. Then let him powder and dissolve it in as much boiling water as will, stirring with a tea-spoon, render it fluid. To this solution—kept boiling hot—let a tea-spoonful or two of powdered quick-lime be added; and in a very few seconds a change will be perceptible; for, on applying the *minutest* drop to the tongue, a burning pungency will be discovered. In fact, were the process carried on till all the neutralising carbonic acid were taken from the soda by the lime, the skin of the tongue would be destroyed, and a wound created by any incautious application of the liquid. Things being in this state, let a little sweet (olive) or other oil be poured into a phial with an equal quantity of soft water, then add a few drops of the caustic soda liquor, and agitate the contents of the phial. If due proportions be employed, an *emulsion*, as it used to be termed, will be formed; but, chemically speaking, soap will be produced by the union of the caustic soda with the oil, though it will be in a fluid state, being held in solution by water.

Now, in testing the efficacy of soap in the cure of mildew, the foregoing and other processes should be performed; and I shall shortly show that thereby the questions I proposed may be completely solved. *Soft soap*, the substance chiefly employed and recommended by gardeners, is not a combination of soda and greasy matter: in the preparation of this useful material, caustic *potash* is substituted for *soda*; and they who are so inclined, may operate with these two materials in the manner above recommended—that is to say, mild potash (called *carbonate of potassa*) may be tried in solution upon diseased leaves: this solution may be deprived of the neutralising acid, and rendered caustic by the addition of quick-lime, and then it will combine with oily substances.

Thus I have collected together materials for a course of experiments, and it remains to mention how far I myself have been able to proceed. I stated at the commencement of this article, that I had discovered the mildew upon one or two solitary laterals of apple-trees: to these I applied chemical agents thus prepared. One ounce of the crystals of soda was dissolved in seven fluid ounces of water: the taste of this liquor was far from potent: I plunged the diseased twig into it over night, but did not leave it immersed for one minute. On the following morning every leaf was found killed, and of the colour of rust of iron. I rendered the solution slightly caustic by the addition of a few small pieces of very inert lime, not using any heat. The taste became slightly pungent; and I then diluted one fluid ounce with three ounces of rain water. Another twig was tested in a similar manner with the

former, and on the following morning each leaf was perceived to be killed, and rendered brown. Thus it is apparent that either carbonate of soda, or the pure *alkali* in a very diluted state, will destroy *leaves entirely* ! Whether the latent buds on the twigs will sprout or not, is a point to be ascertained.

A *liquid sulphuret of lime*, made by boiling an ounce of sulphur in a gallon of water, and adding to the hot fluid about twice the quantity (two ounces) of lime, being used cold, did not injure apple leaves ; but it has not yet appeared certain that the mildew will yield to it. I may here remark that this solution is of a yellowish colour, of a powerful taste, and sufficiently strong for many purposes : it cannot be used with safety to melon plants ; but I believe it to be very efficacious where the vine is infested with the red spider, or the pine with the crocus. If a tea-spoonful of Gallipoli, linseed, or train oil, be put into a phial with one or two tea-spoonfuls of soft water, and as much *caustic soda* liquor be added as will combine with it in the form of a white (soapy) emulsion, a plant may be anointed (rose, apple, pea, bean, strawberry, and what not) without material injury : a spottiness, however, will be created, and in the instance of the pea leaf, that peculiar glaucous marbling, which, I think, originates in an insect—as I have found one under the epidermis of the lower side, under those marks—appear to be affected by the fluid, and to become discoloured. Oil alone, in fact, will affect a leaf, and produce discoloration ; it will also, *beyond a doubt*, destroy the mosses and lichens upon the stems of fruit trees, as I have proved and witnessed in the Isle of Thanet, where the dwarf standards are often kept clean by train oil. But the application of this substance is not advisable upon foliage, as the pores (*stomata*) of leaves must thereby be greatly clogged.

After all that I have observed, I arrive at the conclusion, that oil or soda—the chemical ingredients of soap—are efficient applications, in as much as they may destroy a fungus, but that they are each improper agents, and cannot be used with safety to a plant ; that the chemical compound termed *soap*, is one wherein the peculiar qualities of each ingredient is electro-chemically neutralised by the energy of each acting the one upon the other ; and that *soap*, the product, is the only form in which soda, potassa, or oil, can prudently be applied to the leaves of plants.

I repeat, that my experience does not now furnish data whereon to found a strictly philosophical hypothesis ; but that if the experience of the gardener have *satisfactorily proved* that *soap-lather* destroys the *wredo* or other mildew fungus,—I hold it to be beyond *question* or *doubt*, from actual proof, that the remedy *exists in*, and is solely to be



traced to the *chemical union* of the TWO INGREDIENTS. I think it, however, a duty to pursue experiments ; and, if I find opportunity, I shall test every mildewed subject that may fall under my notice, and note the results very particularly.

T.

July 1, 1835.

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ON THE GERMINATION OF SEEDS.

BY W. M.

THE germination of seeds having excited some interest in former numbers of the Register, I was pleased to find the Author of the Domestic Gardener's Manual express that he was prepared to fully investigate the subject, which he endeavoured to elucidate by experiments with seeds under glass. So far they may be conclusive, as by being so placed they have confined with them the moisture from the earth, which having a natural tendency to ascend and disperse in the atmosphere, is by such means prevented and turned to account in accelerating their germination ; also in striking cuttings ; the same method is found to be almost indispensable as regards many plants. I would also remark that the common glass used for horticultural purposes always presents an unequal surface, refracting or reflecting the rays of light in various ways, thereby decomposing it, and rendering it very different from any light of nature ; whereas seeds placed on the natural ground, and left entirely to nature, even should a favourable shower or two cause them to protrude forth the rudiment of a root, the smallest degree of wind or sun would immediately destroy the vital principle, as every horticulturist is aware that plants which have been kept in a confined and rarefied atmosphere, require to be hardened very gradually before they may be safely placed in contact with the free light and air. Hoping these remarks will lead to further investigation, I shall be happy to hear the results in some future number.

W. M.

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LANDSCAPE GARDENING.

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LETTER SECOND.

HAVING promised to give you in detail full descriptions of every principal feature of this interesting country seat, I seize a leisure hour

to revert to the approach over which I passed so rapidly yesterday, and which consequently was passed without making such remarks as were requisite thereon. Nor could I have then been able to describe it as it really is, without the information which I now possess, as conveyed to me by my good friend in conversation last night.

The London gate, or principal entrance to the house, was placed where it is, because the turnpike road, which passes through a part of the estate, makes, in that place, the nearest appulse to the mansion. Another thing, that particular spot was chosen because it lies considerably lower than the site of the house, and thereby allowed a *gently rising line* to be fixed on for the carriage road, which is always a desirable circumstance in approaching a mansion. The architecture of the lodge partakes intentionally of that of the house, though in a properly subdued degree. Nothing can be more preposterous than a splendid entrance-gate to a mansion of less decorated character. The first seems contrived to please or astonish the high-road passenger, or to raise high expectations in the mind of a visiter, only the more keenly to disappoint him on his arrival at, perhaps, a plain brick building of no high architectural pretension. Such discrepancy has been tastefully avoided at this place. A single comfortable lodge for the gate-keeper was also preferred to *a pair of lodges* for one family: a useless sacrifice to the love of symmetry, most unnecessarily, if not absurdly erected at many country seats, and even villas, in this kingdom. Such erections only gave cause for the current taunt that so and so's lodges were like tea-canisters, "green and bohea," as well in form as in diminutive size. The presence of hardy exotic trees as an accompaniment to the lodge, is also quite appropriate, insomuch as it is a "recognition of art;" that is, an inferred acknowledgment that the park has been enclosed and embellished by labour; and that all the dispositions within have been or are the results of study and design. This becomes more and more apparent as we proceed. The line of the carriage road is one of those dispositions, and does not deviate much from a right line drawn from the outer gate to that of the court-yard. It certainly appears to trend away to the right at the point where we first see the house; but it is not more than what a skilful coachman would choose to take in order to set down at the north portico. Had it been carried more to the right, it would have passed through some beautiful woods, and over some fine verdant lawns; but it would have been unnecessarily lengthened. Had it swept boldly down into the valley on the left, it would have had two dreaded inconveniences, viz. descending one eminence, merely for the sake of ascending another. Besides, a carriage road along a valley cannot be sufficiently concealed;

it divides that which is most beautiful as a whole; and moreover occasions the planting of clumps of trees to hide the road from the windows perhaps, and thereby fills up the valley, a circumstance particularly to be avoided.

But the good taste of the proprietor chose a middle course, which has many advantages; it is led along the brow of the valley or upon the edge of what may be called the table-land. This prevents it being seen when looking across it from any other part of the park. The ground is necessarily firm and dry; nor does it receive any surface drainage from higher land. Neither is it so exactly *hanging-levelled* as to be entirely free from gentle undulations longitudinally; these assist to keep the surface dry in wet weather, by carrying the water to the dips, where gratings over drains are laid to receive the flow.

The views into and over the valley on the left, as mentioned in my first letter, and also those to the right, are too interesting to allow the visiter to feel any thing like tedium while on the long sweep from the gate to the house; and the open groves and thickets which so frequently occur along the line, yield as much variety of light and shade as any lover of woodland scenery could wish. A few chairs for the pedestrian, and a *para-shower* hovel fenced from cattle, are placed on the side of the road, and benches round shady trees, are seen in many situations.

My friend described his method of constructing his roads, which is, as near as I can recollect, as follows:—the line is first staked and marked out on the surface nine feet wide; the bed of the road is next excavated to the depth of one foot, the soil being wheeled or carted out and spread, or laid in hollows on each side. The depth of the bed varies according to the nature of the soil: a firm bottom must be found; because it is of no use to lay hard metal on a bog or wet clayey bottom, which would soon swallow it up. But the subsoil of this country is generally a gravel, so that there is not much difficulty in gaining a sound bottom for a road, or procuring from pits excellent materials or metal for making it. In forming the bed the quality or condition of the earth thrown out, will clearly indicate whether any one spot more than another be liable to flooding, or retentive of water after heavy rains, or from land springs. If such occur, a transverse drain is cut across the road one foot deeper than the bed and filled with pebbles; and which, if it be in a dip, will always serve to swallow any water that may collect at that point. When the bed is thus prepared, it is half filled with stones picked off the land for the purpose, or with the coarsest of the gravel from the pits. This foundation is levelled and laid in as compactly together as possible. On this there is next laid a coat of

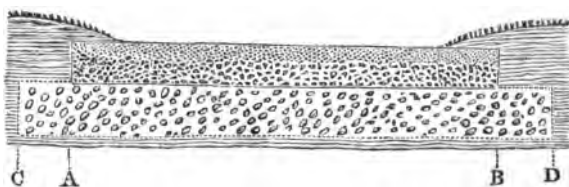
screened gravel, four inches thick, well levelled and trodden firmly down ; and at last about one inch of the finest gravel which passes the screen, all which layers or coats are laid somewhat rounding, that is about two inches higher along the middle. If the two last coats be laid on in that *moist state* in which the gravel is digged from the pit, the whole will bind down into a solid unyielding body, and remain ever after smooth, dry and firm, which are the great properties of a carriage road, and which can only be obtained at the first formation ; for if the gravel of the two last coats be allowed to be thoroughly dried by the sun and wind, it will remain loose for a long time, nor will it bind until it has been repeatedly rolled after rain.

The body of gravel is made much wider than is necessary for wheel carriages, because seven feet are quite enough for these ; but as most roads become uneven and broken up by the lateral pressure of carriages, the gravel is laid a foot farther out on each side to resist, like a buttress, this pressure.

The surface of the road is rather below the turf on each side, because nothing looks worse than a long yellow line intersecting the lawn. Neither is the gravel much raised in the middle ; for wheels running on inclined planes, as the sides in such case must be, they have a grinding action destructive of the smoothness of the road. The edges of the turf are not kept as exactly cut conspicuously hard lines, being allowed to “die off” upon the gravel, and without furrow or gutter at the sides. Neither are there quarters or ruts ; the space of seven feet along the middle being kept clean by the repair of horses and wheels, so that there is very little labour for the weeder. As little sinkings will happen under the wheels for some months after the road is made, they are filled with very fine hard gravel from time to time till the whole is of uniform compactness.

You may imagine perhaps that the width is not sufficient to allow carriages to pass each other. This is perfectly true ; but when it is considered that the turf on each side is so firm as to bear any horse or carriage, no inconvenience or destruction of the grass can take place by turning out ; and especially as such meetings, on a strictly private road, can but seldom happen. Besides, a gravel road wide enough for carriages to pass each other, would require a surface of at least ten feet,—would necessarily occasion a heavy expense to make such a road at first,—it would also destroy a large piece of pasture, and, what is worse than all, would require to be kept at all times free from weeds ; which if it were not, would be a reproach to the proprietor every time he passed along it.

In order that you may have a better idea of the construction of the road, I add a sketch of a transverse section of it.



General width of the road from A to B nine feet. A cross drain under the road from C to D one foot deeper than the bed of the road.

This is the mode of forming carriage roads on the Fairfax Hall estate, and which has been executed by the present proprietor and his forefathers for very many years past. It is on the M'Adam principle; but it was practised here long before that celebrated projector was born; and over his method (as practised upon some of the turnpike roads) it has one advantage, namely, no part of the surface is ever intended to be longitudinally level; because a dead level remains much longer wet after rain, and much more liable to wear into holes, than an ever-so-slightly undulating surface.

While noticing the carriage road, I may as well, at the same time, state how the gravel walks are made and kept in the garden, as described to me by the gardener himself since I began this letter.

The kitchen garden is a parallelogram sloping easily towards the south. The walks run in the same direction as the walls, and are made to partake of the general inclination of the surface. As the roots of fruit trees extend themselves to considerable distances horizontally, it is right they should meet with no obstruction in passing under the walks; and therefore, instead of making the walks upon deep trenches, filled with all sorts of rubbish digged or raked up in the garden when it was made, as used to be the old custom, they are formed on the general surface, in an excavation no deeper than about eight or nine inches. This excavation is levelled and rendered very firm at bottom, and covered with about an inch of pure pit sand, and afterwards with gravel, to the required height. The gravel used for this purpose is what is called *run gravel*; as it is digged from the pit, it is thrown together in a conical heap, the coarsest parts and largest pebbles running off to the base, whence they are every now-and-then raked away. This method of preparing the gravel renders it very uniform in consistence; and when laid, levelled, and put in form by the spade, and immediately trodden across and lengthways with the feet, to show and fill up the

hollows, and afterwards rolled smooth, it forms an excellent walk. The walks in the pleasure ground are formed in the same manner, and kept neat by weeding, sweeping, and frequent rolling, especially after rain. These walks are never ridged up in the winter, as used to be a most ridiculous custom, but they are turned every year soon as the spring cropping, digging, and pruning is over. A gang of men is employed to do this as it ought to be. The utmost despatch is necessary ; because if the gravel gets dry between the time it is raised and trod down again, it will not bind so well as it should do. Two men with mattocks move the gravel to the depth of about six inches ; two others with spades follow close, turning and laying it in form, and keeping up with them comes the treader, crossing forwards and backwards, finding out every hollow, which with the back of a little rake he fills from the higher parts ; and close at his heels another man, with a light garden roller, traverses repeatedly, and finishing the work in as neat and sound a condition, and as pleasant to walk upon, as before the workmen began. The toothed side of a rake is never used in this business : the custom of raking the largest of the pebbles into the opening before the diggers is bad, as it is sure to cause the appearance of ridges across the walk sooner or later ; and besides, the rake leaves too much of the finest of the gravel upon the surface.

Your's as always,

A. B.

31st May, 1835.

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NOTICES OF BOOKS ON GARDENING, &c.

*An Inquiry into the Causes of the Fruitfulness and Barrenness of Plants and Trees, with practical Instructions for the Management of Gardens and Farms, and a System of training Fruit Trees, &c., founded on scientific Principles. Arranged as a Dialogue.* By Joseph Hayward, Esq., Author of "The Science of Horticulture," "The Science of Agriculture," &c. Orr and Smith, Amen Corner, Paternoster Row, 1835.

This book is the production of a gentleman who has long made gardening and farming his study ; and as he is also well acquainted with the science of chemistry, it is in his power to look into and account for many phenomena which are not understood by practical men. On this account the book is well worth the attention of all those who to their practical knowledge wish to add as much of the science as will enable them to improve their practice on rational principles, and satisfy their

own minds as to the cause of many circumstances which occur in the prosecution of their business.

The author has fully explained his own peculiar practical methods of pruning and training fruit trees, with engraved illustrations of the same. This part of the book is interesting, especially to young hands; who ought to store their minds with every thing said or written on so important a part of gardening. No book ever written on the subject but contains something worthy of acceptance; and that now before us certainly deserves a place in every horticultural library. As proof of the author's sincerity, and fearlessness of having his trees examined by practical men, he says in an advertisement bound up with the book, that as regards his "plans of training (which some practical gardeners have been pleased to consider altogether speculative), I shall be happy to afford to any one who will do me the favour of inspecting my garden the most satisfactory evidence of their feasibility; the illustrative figures being, in fact, almost all sketched from trees now in a course of training by myself."

NOTICES OF PLANTS FIGURED AND DESCRIBED IN THE FOLLOWING  
BOTANICAL PERIODICALS FOR JULY, 1835.

EDWARDS'S BOTANICAL REGISTER, continued by Dr. Lindley, contains—

1. *Pæonia Moutan: lacera*. Double red curled Tree Peony: a seedling variety raised by Mr. W. Hyland, gardener to the Earl of Sandwich, at Hinchinbrook.

2. *Angræcum micranthum*. Small-flowered angræcum. A diminutive genus belonging to orchidææ, introduced by Messrs. Loddiges, from Sierra Leone.

3. *Russelia juncea*. Rushy Russelia: a green-house or stove plant, having very slender branches, three feet high, but almost leafless. It however bears handsome tubular scarlet flowers, making it very conspicuous.

4. *Eriogonum compositum*. Compound Eriogonum. A hardy herbaceous plant, found by the late Mr. Douglas, on the gravelly banks of rivers in New Albion.

5. *Clianthus puniceus*. Crimson glory pea. A new and beautiful plant, received from New Zealand, and expected to be as hardy as the *Edwardsia microphylla*.

6. *Colletia horrida*. Bristly colletia. A hardy evergreen, resembling furze, having small campanulate flowers of no great beauty. It is a Chilian plant.

7. *Pholidota imbricata*. Imbricated pholidota. A curious orchideous plant from the East Indies.

THE BRITISH FLOWER GARDEN, continued by D. Don, Esq., Librarian of the Linnean Society. This contains—

1. *Phlox stolonifera*; var. *crassifolia*. Fleshy-leaved creeping phlox. A pretty dwarf plant, received from North America about ten years ago. It is perfectly hardy.

2. *Symphytum Caucasicum*. Caucasian comfrey. Resembles the *S. asperinum* very much, but is a smaller plant.

3. *Rhodanthe Manglesii*. Captain Mangles' Rhodanthe. A beautiful syngenesious flowering plant from the Swan River, Australia. This cannot fail but to be a great favourite among florists. Mr. Don gives an interesting history and manner of culture of the plant.

4. *Primula ciliata*: var. *purpurata*. Purple-flowered, fringed, auricula. This is a hybrid, originated about Manchester, and, like all its congeners, very showy

PAXTON'S MAGAZINE OF BOTANY, for July, contains—

1. *Azalea marginata*. Bordered flowered azalea. A very handsome hybrid, produced from *A. coccinea*, fertilised with the pollen of *A. sinensis*.

2. *Camellia Japonica Cunninghami*. Mr. Cunningham's camellia, produced by a union of the common-striped and the warratah. Many of the flowers are elegantly striped with white. Foliage, glossy green.

3. *Tropæolum tricolorum*. Three-coloured Indian cress. A very elegant species, introduced some years back from South America.

4. *Myanthus barbatus*. Bearded flowered Myanthus. A very curious and fragrant species, imported from Trinidad, by Mr. Lowe, of Clapton; and which flowered at Chatsworth in April last.

## MISCELLANEOUS INTELLIGENCE.

It is just announced in the newspapers, that "*A South Metropolitan Floricultural Society*" is on the eve of being established; and to which a considerable number of practical and amateur florists, both on that and the north side of the town, have already enrolled their names as supporters of the measure. A first meeting has already been held at the Horns, Kennington, to consult on the steps necessary to be taken



to form such a society. This was most respectably attended; and from what then took place, there is every prospect that such an institution may be founded and set going as will ultimately tend to diffuse a love of flowers, and be a source of much rational amusement, not only to the members themselves, but to all those who may choose to witness the exhibitions. Much will depend on the code of regulations for the government of the society, being, in the first place, *well and distinctly drawn up*, published, and afterwards scrupulously adhered to by exhibitors. This may prevent heart-burnings which may occur even among the sweet scents and loveliest forms of the parterre.

*Remarks on some vegetable phenomena, as observable in the growth, &c.*—All observers of vegetable phenomena, as exhibited in the growth of plants, arrive at the conclusion that they not only derive or imbibe elemental food from the earth, but also a considerable portion from the air. The food of plants, as appears from chemical analysis, is composed of three or four simple bodies, viz. carbon, oxygen, hydrogen, and a small portion of what is called azote. These are the ultimate elements of plants, and which are found in the earth, in the air, and in water. They are all aerial or gaseous fluids, and which if they were not, they could not be inhaled or taken up by plants, either through the delicate fibres of the roots, or by the pores of the cuticle of the leaves and bark. Water is, perhaps, the grossest fluid which can enter into plants, and it is probably the medium by which the other nutritive gases or chemical bodies above mentioned can find their way into the vascular system, and so become assimilated with the essential juices of the plant.

That some combinations of those fluids are more nutritive than others has been many times clearly and repeatedly proved, some being absorbed by the roots, others by the leaves. Carbonic, or humic acid, as it is sometimes called, laid within range of the roots of a cabbage, very much enlarges its size; and if the pine-apple plant be grown in air strongly impregnated with ammoniacal gas (the rank scented steam arising from fresh stable-dung), it will not only be increased in bulk, but receive additional vigour from the absorption of the ammonia.

The surface of the earth is the natural station of a great majority of plants, and some are purely aquatic: but there are many to which neither earth nor condensed water are necessary. There are several parasite plants, which, like the misletoe for instance, draw a great part of their sustenance from the plant on which they grow—taking from that what it would have required from the earth, were it a terrestrial plant. Others again, as the tribe of plants called epiphytes, inhabit the stems or trunks of lofty trees, but without sucking from them any of their juices. Such plants flourish only in thickly shaded, and con-

sequently damp woods, in tropical countries; and from their great luxuriance in such situations, it is quite manifest that their numerous roots dangling in the air collect from that medium all the nutriment which is necessary for their support.

There is another description of vegetables which are disseminated on, and germinate in the earth, and from thence draw support by means of their first roots; but as they advance in age and bulk, other roots proceeding from the joints of the stem descend and fix themselves in the soil, superseding the original roots, which soon after decay. Such plants are the pandanus, or screw-pine; of these an aged plant may be seen, supported by a few buttress-like roots, which in their turn also (together with the base of the stem itself) perish as soon as new ones from above have reached and got hold of the ground. In fact, every new set of leaves appears to require a new set of roots for their special service; and which, during their descent, absorb from the air a part of the aliment necessary for the sustentation of the large and heavy head.

There is yet another and extensive tribe of plants called succulents, which are remarkable for their heavy and substantial leaves and stems, and furnished with a very diminutive system of roots, and moreover flourish in the driest and poorest soils—nay even where there is no soil of any kind, but merely a chink in a rock, into which a few radicles only are insinuated.

All these circumstances combined go far to prove that, in the instances adduced, a great, if not the greatest portion of the elemental food of plants is derived from the air, and that this is as capable of distending the vascular and cellular membranes of plants as that which is received from the earth. If this idea be at all feasible, may it not be employed in accounting for some circumstances in the growth and development of the cellular and vascular membranes of trees which appear to be involved in no little obscurity?

By the closest inspection of the gradual accretion or growth of plants—whether we take the most minute of the *Cellulares*, or the grossest of the *Vasculares*—whether we examine with the keenest eye or the most powerful microscope, we can only detect a change from small to greater magnitude, from a state of indistinctness in which the parts can neither be seen or numbered, up to perfect form when both forms and numbers are plainly recognisable. An atom of this cellular membrane composed, let us suppose, of twelve distinct cells, may be no larger than the head of the smallest pin, in the month of May, will be, before the end of August, twelve times larger, not by any additional number of cells, because that is impossible, but simply by the enlargement of each of the original twelve. This notion infers that every cell, vessel,

or organ composing the vegetable fabric has rudimental identity before it is developed; and, therefore, that growth is nothing more than simple distension. The notion is, however, completely opposed to the opinion of those who imagine that every part of the structure of plants is formed of what is called elaborated sap.

Whether the idea as above stated be reasonable or not, or whether the opposition to the opinion of others be or be not justifiable, is not the direct object of these remarks; they point to another question, which may, perhaps, be worth the physiologist's consideration.

In witnessing the development or growth of the new layers of wood and bark every year added between the layers of these members formed in the preceeding year, we invariably observe that it, the swelling membrane or new growth, increases *faster downwards* than it is extended in any other direction. For instance, let us suppose a piece of bark two inches square to be removed from the stem of a tree of any kind or size in the month of March, when it will part easily from the wood. The edges of the wound is composed of as many layers of liber as the tree is years old, and underneath all these lies the membrane which will be distended into new layers of liber and wood in the ensuing summer. The membrane at this time is hardly perceptible, appearing like thin mucus or jelly; but if occasionally examined, it will be observed to harden in the air, and remain motionless till about the end of May, sooner or later, according to the forwardness of the season. About that time, however, it may be seen protruding from under the bark all round the wound, and will continue so to do till the growth ceases in the autumn. When this happens, it will be seen that the new member has proceeded much *further downward* from the upper lip of the wound, than it has at the sides, or at the bottom; and this the new layers of every succeeding year will continue to do, till the wound is wholly covered and healed over.

Many other instances may be given of the tendency of the new member to *descend* with more rapidity than it is extended in any other direction. The manner in which layers and cuttings are usually seen to make roots, is a familiar example: first, there appears the membrane alluded to descending and forming what is called a callosity at the base of the cutting, whence fibres are afterwards emitted. The same kind of swelling takes place round, and particularly at the point of the tongue of a layer, before it ejects radicles; though it may happen that cuttings as well as layers will be furnished with roots without any callosity being first formed.

These are unquestionable proofs that the vital membrane of a plant descends with more facility than it, as already observed, is enlarged in any other direction. It is a long established fact, known to every prac-

tical man, and who, in accounting for the cause, always attributed the incident to the *autumnal descent of the sap*; others have supposed it to be caused by the *descent of fibrous processes* from the superior buds. Both these ideas have been partly objected to. Relative to the first, it has been averred that no enlargement of any part of a plant happening in the months of May or June, can possibly be caused by the descent of sap in autumn; and to the second it has been objected, that the healing of a wound at the base of a lofty tree, sixty or seventy feet below any active bud, cannot be healed by processes produced by buds so far above the wound.

That the sap of a tree is diffusible in all directions, has never been, nor cannot be denied; but that there is any general subsidence in the autumn, after the growth ceases, is extremely problematical. If there be any descent of either sap or physical member (*and that there is something of the kind, is perfectly evident*), it must begin to descend at the commencement of the summer growth, and continue till it ends.

From what has been stated, two or three questions naturally occur, viz., which constituent of the plant is it that has a tendency to sink rather than to be distended vertically or laterally? Has the action of the atmosphere any effect on the ordinary development of vegetable membrane? Can the induction of the food of plants, either from the earth or atmosphere, have any influence in impelling the development?

To these questions a few words by way of answer may be given. To the first it may be replied, that the vital membrane is the only constituent possessing susceptibility of change; and which is spontaneously mutable under the external influences of heat, light, and moisture. This membrane is exceedingly delicate and colourless before it is formed into wood or bark. When exposed to the air and light, it becomes incrustated by a film, which in time becomes the bark. This hardening of the exterior is always in proportion to the degrees of light and heat falling thereon: of course the more exposed parts are sooner and more thickly incrustated than the sheltered parts; and hence the lower edges of the exposed membrane are protruded downwards with more celerity than the more exposed parts. Whether as a body, or when projected in fibrous processes, the direction is invariably downward to gain darkness and moisture. These last observations answer the second question in so far as relates to the vital membrane and roots of trees; but which is directly contrary to the vertical tendencies of the stems of the same.

The third question refers to whether or not the nutriment received at either extremity affects the expansion in an opposite direction: in other words, does the nourishment received by roots accelerate the upward growth; and is there any reason to believe that food imbibed

from the atmosphere can so far subside in the cellular and vascular structure as to nourish and enlarge the inferior or lower parts of the plant?

That suitable and abundant supplies of vegetable food in the soil, quickens as well as strengthens all herbaceous plants, is as obvious as any other fact concerning them. The same may be said of shrubs and trees: for so long as water is present, in which the other bodies necessary to growth are held in solution, the plant increases in size; but when the moisture of the soil is exhaled away, the plant withers and dies. Here, indeed, we do not perceive that plants liable to such casualty are provided with inlets to imbibe sufficient nourishment from the air, to prevent them dying for want of water at their roots. But with respect to the different tribes of plants first adverted to in these remarks, the case is quite dissimilar; for among them we see that they derive the principal if not the whole of their food from the air, or rather from the constituents of the atmosphere. This being admitted, we may rationally suppose that accumulations of nutrition are formed in the superior parts of the plant, and that it is somehow conveyed to the lower members.

It is not easy to conceive how imponderous fluids can sink in the vascular organisation of plants; but it is highly probable that heavy fluids descend as well as ascend in the tubular and cellular structure. If more water be absorbed by the leaves than by the roots, it is quite possible that an equilibrium will be maintained by the excess above sinking to the empty vessels below. A piece of sponge may be completely saturated by water, whether the latter be admitted by the base, or dropped upon the top or upon the side. And if in the plants alluded to, or in others, any thing like a descending current be generated, may not this be the cause of the downward processes before described? not that any kind of fluid in a plant can be transformed into bark or wood, or any other part of the organic structure, but as a *distending* constituent only.

The above remarks and observations are stated with a view to call attention to the subject: the inferences must be considered in the light of interrogatories, rather than assertions, because we have many things yet to learn concerning vegetable phenomena; and it is desirable that every part connected with this branch of horticultural science, should receive frequent discussion and unceasing attention, especially from those practically engaged in the culture of plants.

**MODE OF PRESERVING GRAIN.**—It is indispensably necessary to have the sheaves bound in a tight close manner, not too large, which is easily done by placing the knee firm on the sheaf when the band is drawn.

The sheaves then to be carried together by all hands, as expeditiously as the nature of the case may require, to be placed in a round circle, leaving room within the circle for the small rick or stack to be built, which is to contain about a wagon or cart-load ; this is to be regulated according to circumstances, as to the bulk of the crop, and length of the sheaf. The rick to be built in the same way as a small one would be in the stack-yard, by going round on the knee, keeping the crop of the sheaf well up under the knee, in the middle, rather above, or higher, than the butt. The small sheaves to be put aside till the largest are stacked, as the small ones can be easier brought up to a point, and will prevent the rick or stack from becoming top-heavy. The topping-sheaf is banded rather nearer the butt than the others, and is inverted over the top to be fastened down ; thus a roof is formed like the thatch of a bee-hive, which effectually shoots off the rain, and although the top-sheaves are exposed, by their pendulous situation, in which every grain is preserved from the wet by its own individual husk, they are thus preserved from receiving injury to a great extent. Should these few hints be found useful at a future untoward season, the writer will be amply paid by its adoption. A little practice, with a handy farming man, will soon remove all the difficulties, and the wheat-grower will be amply remunerated for his perseverance.—*Morning Post*, Sept. 3, 1834.

**HORTICULTURAL SOCIETY OF LONDON.**—The third exhibition of choice specimens of flowers and fruit, for various medals given by the Society, took place on Saturday afternoon (the 4th inst.), in the garden at Chiswick. As it was announced to be the last exhibition of the present season, and the day was exceedingly propitious, between four and five thousand persons of rank and fashion assembled. Among the company, we noticed the Duke of Cambridge, the Earl of Mansfield, Lords Downes, Farnham, Dartmouth, Feversham, and Strathaven, Admirals Lambert and Southeron, Baron Gurney, General Phipps, the Russian and French Ambassadors, the Bavarian Minister ; Sirs Charles Cockerell, R. H. Vivian, Felix Booth, Charles Morgan, Moore Disney, Charles Monck, W. B. Proctor, Charles Lemon. An immense assemblage of ladies of distinction also honoured the Society by their presence, and gave additional lustre to the delightfully animated scene. The Coldstream and Grenadier bands, with that of the Royal Blues, were stationed in various parts of the garden, and throughout the afternoon played many popular pieces of music. The exhibition, as usual, took place under extensive tents, in the southern part of the grounds. The show, as a whole, was certainly not equal to the last exhibition ; but there were numerous specimens of both flowers and fruit which could not fail to excite general attention and admiration. The Thun-

bergia seedling, a variety from Alata, was a splendid specimen, it being perfectly white. Orchideous plants, from Messrs. Loddiges's, were extremely fine, and they also exhibited a beautiful specimen of *Rondeletia speciosa*. The mimuluses, from the garden of the Society, were novelties, and attracted much notice. The general collection of balsams, cacti, alstromeriæ, &c., from the garden of Lady Antrobus, was of the first order. The cockscombs, from the garden of Mr. Palmer of Cheam, were perhaps never surpassed: the collection was much admired. The dahlias, from Mr. Hopwood, were also beautiful specimens. Grapes, peaches, pines, melons, strawberries, and other fruits, were produced in the greatest perfection. Mr. Wilmet's red currants were of an extraordinary size. There were also numerous other specimens of fruits and flowers, which were much admired. Every exhibitor is required to sign a written document, that the articles intended for show have been in his possession at least four months, which is an excellent regulation, and ought in all such cases to be strictly adhered to. The award of a large silver medal for Sweet-William excited surprise, as being thought less worthy reward than many other things on the stages, which cost much more labour and expense to bring to perfection.

DEVON AND EXETER BOTANICAL AND HORTICULTURAL SOCIETY.—The twentieth exhibition of this society, and second for the present year, took place on Thursday last, at Congdon's Subscription Rooms, in this city, and was magnificently rich in plants and flowers, among which were most elegant *Fuchsias*, *Ericas*, &c. &c., while it is believed the show of the *Geraniaceæ* family, as well for number as transcendent splendour, has never been surpassed. There were also rare and singular plants that were objects of great curiosity, among which was a specimen of the *Aroideæ* or Arum from the grounds of Lucombe, Pince, and Co. the properties of which are probably not yet fully known in this country. In the large contributions of this firm also to this exhibition, was an air-plant of the *Orchis* tribe, the cultivation of which was not long since supposed to be attended with insuperable difficulties. Formerly, indeed, they were scarcely known to us, except from drawings, and the imperfect dried specimens that were brought hither, and so unacquainted were we with the habits of the plant that no one expected to preserve them beyond a few months after their importation. Perseverance, however, together with studious attention and increased knowledge, having led to the application of physiological principles, difficulties in this way have been so far overcome, that Mr. Pince showed on this day that Orchideous air-plants may be rendered common, and that the time may come when its beautiful flowers may diffuse their delicious fragrance as generally in the drawing-rooms in this country,

as they have long done in the houses of the Chinese. In the collection of Lucombe, Pince, and Co., we were also pleased again to see that member of the *Cytinææ* family, the *Nepenthes distillatoria*, or pitcher-plant, to which the Adelaide Prize Medal was awarded when shown by Messrs. L. and Co. in London. This is a truly singular plant and drew general attention: it may be thus briefly described: it has at the extremities of its long broad leaves a hollow vessel, exactly of the shape of a water-pitcher, with a lid at the top, which opens and shuts by a flexible hinge. It is understood that its favourite haunts are marshy situations, but the fluid which is secreted from its juices, and fills these pitchers, is pure and limpid water. Mr. Veitch also had many very curious and singularly fine specimens, among which were several Orchideous plants, and splendid Calceolarias, as also others that we shall by and by enumerate in a fuller manner. In the same way we must speak of the contributions of Messrs. Nott and Hewett, successors to Messrs. Dymond, nurserymen and gardeners, of this city; of Mr. Geo. Craggs, jun., nurseryman and gardener, of this city; and of Mr. James Manley, Heavitree. Nor ought we again to omit to say, that in this instance as on former similar occasions, to the disinterested and generous conduct of nurserymen and gardeners, the exhibition owed much of its splendour.

The room on its opposite side was occupied by the beautiful and most liberal contributions of Mr. James Veitch, of Killerton and Mount Radford Nurseries, Exeter, in the distribution of which also much judgment was displayed.

But one thing which attracted particular attention was a drawing exhibited by Mr. Veitch, of *Clanthus puniceus*, a hardy New Zealand plant of extraordinary beauty, lately introduced into the kingdom, and which promises to be one of the most valuable acquisitions in hardy shrubs introduced for many years: it is figured in the 7th vol. of the London Horticultural Transactions.

Messrs. Nott and Hewett had a choice collection of Pelargoniums; amongst which were the *Pelargonium Hericartianum*, *P. pavonium maximum*, *P. surpass Man of Ross*, *P. Black Prince*, *P. Rosalind*, *P. Stativa*, *P. Zorab*, *P. Lucifer*, *P. Clarissa*, *P. Diomedæ*, *P. Lady Denby*, *P. Capt. Cook*, *P. Cicero*, with other excellent sorts of this family. Also a choice collection of Roses, consisting of nearly 200 distinct varieties.

Two exceedingly rare and beautiful plants, the *Pentstemon speciosum* and the *Eucalyptus pulverulenta*, exhibited by Mr. Craggs, were much admired, and particularly noticed by the committee.

Mr. James Manley, Heavitree, presented a small but very select



collection, among which were thirty seedling shrubby calceolarias, one of them pure white, a great rarity ; there were also among them scarlet, dark purple, cream colour, very large ; others variegated : a great variety of shrubby calceolarias named. A number of seedling geraniums, in one of which the upper petals were black and the under ones pure white, to be named *Enchantress*, for its extraordinary rarity. Seedling pinks a very beautiful collection. Of seedling heartsease a large collection. A collection of roses, very good. A beautiful green-house plant, *Pimelia decussata*, in full bloom, &c.

The show of fruits though not large, was in many respects very fine ; there were those, however, there that were scarcely worthy such a situation. The apples, as well of the last year's crop, as the produce of the present season, were extraordinary, but there was a failure of melons.

Of vegetables, the exhibition as well as being large, was singularly fine, and among them we were pleased to witness the abundance as well as quality of those produced by cottagers : among these was an extraordinary cabbage, afterwards more particularly noticed, and mentioned here because grown by the deserving cottager mentioned at the last exhibition, on a before barren spot at the top of Stoke Hill.

The judges on this occasion were: for Fruit—Dr. Miller and J. Dunston, Esq., Carsfield, Clist St. George. Vegetables—Captain John Greenway, R.N., St. Thomas ; Captain Toll, Perridge ; Thomas Snow, Esq., Franklyn. Flowers and Plants—Thomas Pring, Esq., Forton, Crediton ; and Mr. C. Booth, gardener to James Wentworth Buller, Esq., Downes. Cottagers' Prizes—Dr. Miller and J. Dunston, Esq.

## FRUIT.

PRIZES.—The best flavoured Pine Apple, not less than 2lbs. weight, £1, to Mr. R. Glendinning, gardener to Lord Rolle ; the second best ditto, not less than 1½lbs. 15s, to Mr. T. Saunders, gardener to C. Hoare, Esq. ; the best dish of Black Grapes, 15s, to Mr. R. Glendinning ; the best dish of White ditto, 15s, to ditto ; the best dish of grapes of named sorts, 15s, to ditto ; the second best ditto, 10s. to Colonel Wright ; the best Melon, 10s, to Mr. Glendinning ; the second best ditto, 7s, to ditto ; the best dish of Cherries, not less than 1lb., 10s, to Mr. Mason, gardener to Sir John Kennaway, Bart. ; the second best ditto, 7s, to J. Gidley, Esq. ; the best dish of Strawberries, 15s, to Mr. W. Wood, Gardener, Farrington House ; the second best ditto, 7s, to S. T. Kekewich, Esq. ; the third best ditto, 5s, to Dr. Tayleur, Teignmouth ; the best dish of Dessert Apples, 10s, to Mr. James Davey ;

the second best ditto, 7s, to Mr. Geo. Craggs; the best dish of Dressing Apples, 7s, to Mr James Davey; the second best ditto, 5s. to Dr. Tayleur.

**EXTRA PRIZES.**—7s, to T. Snow, Esq., for Raspberries; 7s. to E. Granger, Esq., for Codling Apples of this year; 7s, to Mr. T. Saunders, gardener to C. Hoare, Esq.

### COTTAGERS' PRIZES.

**FRUIT.**—The best dish of Apples, 5s, to — Bending, Ottory\*; the second best ditto, 3s, to ditto; the best dish of Strawberries, 5s, to mark W.

**VEGETABLES.**—The best dish of Red Potatoes, 5s, to W. Plimsaul; the best bundle of Leeks, 5s, to Wm. Hill; the best dish of Potato Onions, 5s, to mark W; the best bundle of Turnips, 12 in number, 5s, to Check 24; the best bunch of Carrots, 12 in number, 5s, to Wm. Hill; the best 3 Cabbages, 5s, to Richard Westlake, Stoke Canon; the best dish of Peas, 5s, to Thomas Crocker, Topsham; the best Collection of Vegetables, not less than 6 sorts, 7s, to Wm. Hill; the second best ditto, 5s, to Thomas Crocker.

**FLOWERS.**—The best bouquet of Flowers, 7s, to — Bending, Ottory; the second best ditto, 5s, to James Martin, Kenton; the third best ditto, 5s, to Thomas Crocker.

Having concluded, Mr. Gidley, the Secretary, desired to call the attention of those present to the exhibition for Cottagers' Prizes at the other end of the room. This, he said, is part of the plan of the society, from which I hope I may be allowed to say, the most substantial benefits to that class of persons immediately, and to all, though more remotely, are likely to arise, and the Committee and the Judges desire me to mention, as I do with as much pride as pleasure, that the best apples in the room are sent here by a Cottager (Cries of hear).—and that also, a production from a Cottager's garden, there is a cabbage 17lbs. weight.—(Hear, hear.)—In conclusion then, permit me to thank you for the countenance you have given the Society by your presence this day, and to say, the next exhibition will take place at a season when it is probable the show of fruit will be of a large and superior description, and when the Committee hope to be honoured with a like large attendance.—(Applause).

**ON THE FOOD OF PLANTS:** By Joseph Hayward, Esq.—(Extracted from the British Farmer's Magazine.)—Sir,—Your Magazine having of late been much occupied by observations on the nature and appli-

\* The best Apple in the room.

cation of the food of plants, and the manner in which the subject has been discussed appearing to me to be calculated rather to lead a practical man astray, than to establish such demonstrative truths as will lead to improved methods of cultivating the earth, I take the liberty of offering a few axioms for the consideration of your readers.

1st. Plants require food to sustain them, as much as animals.

2nd. From the peculiar formation of plants, they cannot take up any thing into the system as food, but in a state of solution in water.

3rd. The quantity and quality of the food supplied to plants, determine their growth and produce.

As to the first, we need not attempt to offer proofs that plants cannot grow without water. And as to the second, although many of the most ingenious experiments have been made, it never has been proved that plants imbibe or take up any substance, except in a state of solution. And as to the third, the two first being admitted, that must follow as a matter of course. Although it is proved that plants may be sustained alive, and will acquire some extension of bulk when supplied with no other matter than what is contained in pure water; yet it is proved, that in water alone, plants will never attain any thing like the size and proportions as when supplied with carbonaceous matter, nor will they ever fructify when grown in water alone. And if it be proved that plants will grow to their utmost extent, and fructify in perfection, when duly supplied with carbonaceous matter, it must be just to infer, that such carbonaceous matter as is necessary to sustain plants, is absorbed by them from the soil or substance in which they grow, and, consequently, that in course of time, plants, by growing in a soil must exhaust its carbonaceous matter, and that by such abstraction the soil must become more or less sterile. To suppose, then, that simple earth and water can, by being simply stirred and exposed to the atmosphere, be rendered capable, and kept in a state of capability, to sustain vegetables in their production of fruit and seeds, must be contrary to common sense as well as to experience. But although the professed advocates of Jethro Tull seem to indulge in visionary conclusions, I do not mean to assert that he himself was a mere visionary, nor that his estimations of the effect of horse-hoeing were groundless: the following facts will show how such operations may be profitably productive. If a quantity of the leaves of trees be collected, and immersed in a cistern or pool of stagnant water, and permitted to remain undisturbed for three years, they will be decomposed, and in appearance will be in that state which, placed on the surface of the earth, should form a fertilising substance; yet it will be found so sterile that no plant will grow in it. But, if the same quantity and kind of leaves

be collected and placed in a heap on the surface of the earth, and two or three times in each year be turned over and exposed to the atmosphere for three years, this will form a substance or soil in which plants will grow, and obtain the utmost luxuriance and prolificacy. Taking these two processes, then, to mark the extremes in the preparation of the food of plants, we may easily trace the degrees of the fertilising effects of the various operations of agriculture. If the roots of plants could be abstracted from the earth entire, they would be found to bear a large proportion in the comparative weight of the leaf, stalk, &c. ; and as these are generally left on the soil, it must be obvious, that if they or any vegetable substances are decomposed, and left undisturbed in the earth, the result must be very much like that of decomposed leaves under water. And if these are brought on the surface of the earth, and decomposed in contact with the atmosphere, which is the case when the earth is frequently turned over, the result must very much resemble that of the leaves when decomposed on the surface of the earth ; and therefore digging, ploughing, and hoeing, must be fertilising operations. Chemically considered, we may take the carbonaceous matter produced under water to be hydro-carbonate ; and that produced on the surface of the earth, and exposed to the atmosphere, to be oxy-carbonate ; and hence, we may not only conclude, that in proportion as the oxy-carbonate prevails in the soil, will the plant be brought to and sustained in a fructiferous state ; but every person who will make any practical experiment that can elucidate the truth, as I have repeatedly done, will find it to be as I have described.

THE INFLUENCE OF THE ORIGIN OF SEEDS ON THE QUANTITY AND QUALITY OF CROPS : By Dr. Brown. *Translated from the Journal d'Agriculture des Pays Bas.* Extracted from the British Farmer's Magazine.

Even to the present day, the cultivators of forest trees, have not generally taken advantage of a phenomenon which is presented to us in the cultivation of agricultural plants ; and although it has not yet been sufficiently explained, is, nevertheless, well established. This phenomenon is the influence which seed exerts on the quantity and quality of the crop which is produced from it, according to the different natures of the soil and climate from which this seed has been procured. The good results of this influence have appeared after using seed from a cold climate and a tenacious and cold soil, in a warm climate and a dry and light soil ; but they are also equally apparent under circumstances quite the reverse, provided the soil be not too dry and barren, and the seed has had the opportunity of being perfectly matured. It appears, then, that the two opposite kinds of soils and climates profit equally from a

change of seed. Let us consider and examine at first a few observations which may serve to explain the phenomenon, and thence endeavour to deduce the physiological law, and apply it to the cultivation of trees.

The advantages resulting from a change of seed are generally recognised in the cultivation of agricultural plants. In some mountainous countries, in Scotland for example, they bring the seed from the low countries and from the plains, where the climate is more mild, and, consequently, the seed is more forward, a quality which it preserves for several generations. We are convinced that the cultivator of this mountainous district, if he always used seed from his own crops, would reap later and later harvests, so that at last, perhaps, they would not come to perfect maturity; a circumstance easily explained by the short duration of the summer in the mountains. If, on the other hand, the cultivator of a flat country, the climate of which is mild, and the soil dry and light, continually made use of his own seed, it would head every year sooner, the stalks would become shorter and smaller, and in time, there would result but a poor produce. In the last case, the cultivator brings his seed with advantage from a colder country, the soil of which is good and substantial. Probably these are the circumstances on which rests entirely the difference between the cereal and other plants of summer and winter, a difference too variable to be easily determined.

The flax, without doubt, presents us with the most striking example of this phenomena. We, in the neighbourhood of Liege, with great advantage to our crops, bring our seed from Riga, that is, from a colder climate, the sowing of which causes the grain to be slowly formed, and thus leaves more time for the development of the stalk, which is the principal object of its cultivation. To judge by analogy, we would be led to believe that the result would be the same, were we to obtain from a colder country and a colder soil, the grain of the clover and other plants used for forage, in the cultivation of which our object is large stalks and a well-developed foliage. Even at the present day we are without experience on this head. Generally all plants which are cultivated for their grain or fruit, need little or no manure; while abundance is necessary for those plants from which we wish to obtain large stalks and leaves.

Fruit trees which shoot vigorously, generally bear little or no fruit; and every circumstance, which on the other hand, prevents the too great growth of wood, favours the formation of fruit. On this observation rests the cultivation of dwarf fruit trees and espaliers; also that of the vine, &c.

Field and culinary plants under equal circumstances blossom sooner

in dry, warm, and clear summers, and their stalks and leaves are smaller, than in rainy and cloudy summers.

From these and many other analogous observations we can deduce a physiological law of the greatest importance in the cultivation of plants, to wit;—Every thing which favours the disproportioned growth of vegetables, opposes or retards their propagation, or formation of fruit; and vice versa, the formation of fruit is hastened and forwarded at all times when exterior circumstances prevent the full development and disproportioned growth of the stalk.

Now to apply this law to the rearing of trees, I ought, first to remark that, many of the phenomena which I have mentioned, are equally apparent in the vegetation of forest trees, although they have not been so much noticed. In fact, we see the greater part of our forest trees bear seeds sooner, more often, and in greater quantities with a south exposure, and in a dry and light soil, than with a north exposure, and on a cold stiff soil; while under the latter circumstances they acquire greater dimensions.

Many trees, the birch for example, vary with regard to the time of budding and formation of seed, some being forward, and others late. It is well ascertained that those which bud late, have the hardest, heaviest, and in many respects the best timber: and increase more in volume within a certain time, than the more forward kind. It is not yet proved that the same phenomena may take place relative to age, i.e., that there may be varieties which blossom and bear seeds, and the growth of which, consequently, diminishes at different ages. This appears very probable, since we frequently see larches, firs, birches, and trees which had their origin in a cold and elevated country, bear seeds in a low, warm, and dry country, after having scarcely reached the age of ten or fifteen years, and ten or fifteen feet in height; and the growth of which afterwards becomes sensibly slower.

From this observation we may conclude that the trees of cold climates produced from seeds gathered from dry and level countries will degenerate after many years to dwarf trees, shrubs, bushes, &c., which will scarcely be of any value as forest trees. Every attentive cultivator of forest trees will have already noticed similar examples, which will justify this conclusion.

From all that precedes, I deduce for the rearing of timber trees this general law: it is necessary to procure, as far as possible, the seeds from a colder climate and stiffer soil, than the climate and soil of the country on which you wish to rear those trees.

Since, some time back, in France and elsewhere, the preference is

generally given to the seeds of the pine from Riga, Norway, Scotland, Hagenau, &c., and the rule which it is my wish to establish, has thus been followed by us, but without our having been able to justify this preference by reasonable motives. The same rule will perhaps become useful in introducing foreign forest trees, for it is very probable that the little success met with has been owing to an improper choice of seed."

We have made the above extract because we believe it relates to a point of practical arboriculture which is of the utmost importance to nurserymen and planters in general. Not that it is a new discovery, or idea, of the respectable Professor Bronn, because it has long been acted on in Britain; but it is a satisfactory corroboration of the British nurserymen's practice, who, we believe, are at no inconsiderable expense in importing seeds from the continent and elsewhere in order to obtain the results contemplated by the Professor. And it is not only in the case of forest trees, but in that of all other cultivated plants, that *a change of seed* is one of the best rules of practice which can be followed by every cultivator. Even a change of bulbs and tubers, as is exemplified in the success of the best flowering plants, and that of the invaluable potato, shows how much a change of soil and air is enjoyed by these, as well as, perhaps, by every other plant.

AGAVE AMERICANA.—At Bute House, the Villa of the Right Honourable Viscountess Dillon, at Old Brompton, there is one of these splendid and rarely flowering exotics in full bloom. The flower stem is rising towards fifteen feet high, surmounted by a fine-branched head of flowers. Her Ladyship has been at the expense of erecting a canvas covered frame to shade, and thereby preserve its beauty as long as possible.

Mr. Briant, her Ladyship's gardener, states that, he is uncertain as to the age of the plant, but has traced its history for at least forty years back. It is a plant of the striped variety, which we believe never arrives at so great bulk before flowering as the common unvariegated sort. The large substantial leaves which have so long involved and now surround the stem, seem as if they were solely intended as reservoirs of the nutriment required for the development of the fructification; because already the lower leaves have lost their plump rigidity, and become flaccid and drooping; and by the time the flowers are expanded, the whole of this division of the plant will inevitably perish, except perhaps a sucker or two which may rise from the root. This decay immediately after the maturation of seed, or development of the head of flowers, happens in consequence of the peculiar structure of the genus, and which separates it so completely from the genus *Aloe*, with which

it is often associated, and whose name it most frequently bears. The aloes, however, produce their flowers laterally, that is, from the axils of the leaves; whereas those of the *Agave* are terminal, that is, placed on the point of the axis of the plant. There are several other plants constituted in the same way. Some of the Palms are purely *individual*; but the most familiar example is the common house-leek, which though constitutionally like the agave, is neither ranged with it in the same natural order, nor yet in the same class of the sexual system.

ENTOMOLOGY.—The habits and transformations of the common gnat are truly wonderful. "In the dipterous, or two-winged flies," says a late writer, "the larva is termed a maggot, having no articulate, or prehensile feet; and generally preying on decayed animal substances. The house and flesh-fly (*musca domestica et carnaria*) are well known familiar instances; I shall, therefore, refer to the history of the gnat, as more particularly meriting attention. Its larva is an inhabitant of the water, and consequently needs some contrivance to breathe in the absence of those spiracles which are allotted to its land brethren. For this purpose a slender tube is attached to one of the posterior rings of the abdomen. The extremity of this tube is surrounded with a fringe of hairs, which when expanded, enables the larva to float upon the surface of the water, and when it descends, the hairs shut round, enclosing a silver-like bead, which enables it to dive at pleasure." This action of the larva may be seen in any open water-butt or cistern during the summer months; their jerking motions when disturbed readily point them out to the observer. "When the larva assumes the pupa state, it loses this curious apparatus, and respire by two horns placed on the head; and when at last perfectly formed as a gnat, again changes its breathing apparatus to respire through spiracles. In about ten days after the larva has become a pupa it prepares to emerge into the air;—but how is to accomplish this without wetting its wings, which if it once does it perishes. The process it performs with this intent is very curious. The moment the head of the pupa is raised above the water it bursts, from whence the perfect gnat within gradually puts forth its body, rising like the mast of a barge, after passing beneath a bridge. Thus the pupa-shell is now a boat, and the gnat the mast and sails; and it frequently happens that a gust of wind upsets the unfortunate and inexperienced navigator. But in general, when almost emerged he gradually lowers himself so as to touch the water with his feet (for this faculty of walking on the water is one of his powers), and then, stretching his silken pinions, he flutters away to join the myriad bands of his companions, assembled for sexual intercourse, and which in dark squad-



rons, like clouds of smoke curling, fill the twilight air to a great height."—*Analyst*, July, 1835. The gnat is the favourite food of the hirundines, and therefore, the gnat is endowed with an instinct not to venture abroad till the birds have retired to rest. Many are captured, however, by the swallow tribe while floating on the surface, before their ascent into the air.

OF THE GRAPE.—“The great importance of this fruit, as being one of the richest gifts of nature to man, must be the author’s excuse for being more diffuse in his account of the history and culture of the queen of fruits, than otherwise might be thought necessary; but he will endeavour to be as brief as possible, more especially as he begins to find his manuscript swelling under his hand to a much greater extent than he either anticipated or intended.

“The cultivation of the vine seems to have been coeval with man in his first state of civilisation. The use and abuse of its precious juice appears to have been known even in Noah’s time; and no doubt the plant followed the footsteps of man into every region and climate where the plant could succeed. The warmer parts of the temperate zone are the natural climate of the vine, or upon the elevated parts of tropical countries, where the sun’s heat is mitigated by the height of the mountains above the level of the sea.

“That the vine was gradually brought from the southern to the northern parts of Europe, is a very natural transition. Whether it was brought into England by the Romans, is not, perhaps, certain; but we are well assured that as soon as this country came under the ecclesiastical government of the Pope of Rome, and when that then powerful potentate established colonies of Italian monks in various parts of these kingdoms, they introduced for their own personal gratification every species of their own native fruit and vegetables which had any chance of succeeding in Britain. Among the rest the vine was not forgotten. This tree was not only planted against the walls surrounding the monasteries; but considerable portions of the most suitable land belonging to these establishments were planted and enclosed as vineyards for the production of fruit only. Some of these enclosures remain to this day, though the vines have long ago been rooted out. That vineyards were planted by, and in possession of laymen in those days, is also evident, from examination of some tithe-rolls belonging to religious houses, in which the tithe of wine or grapes are particularly mentioned.

“Now, although we are informed that vineyards were planted, and yielded fruit in great quantities in those early times, we need not suppose that the grapes were fully ripe. Excellent wine can be made

from unripe fruit, and might very well suffice for the cloistered monks, as well as for our own hardy barons, before commerce had opened to them the wine vaults of the continent.

"But that vineyards may and have succeeded in our own times, is beyond a doubt; that at Painshill, planted by Mr. Hamilton, answered well; he selling in some years hundreds of pounds worth of wine! But the culture of the vine for wine-making is no longer either a necessary or a profitable pursuit in this country. The vineyards of France, Spain, and Portugal, furnish us with the best wines, far cheaper than we can manufacture them for ourselves. This, among other causes, has operated to discourage the culture of the vine in the open air in Britain; and has confined it to the walls of gardens and nurseries, to the walls of dwelling-houses, and to forcing-houses built for the purpose.

"In such situations the treatment of the vine has been brought to the greatest perfection, especially since the publication of the excellent works of Kennedy and Speechly on this fruit-tree. It is remarkable that Justice makes no mention of vine-forcing in his very useful work published in 1732; so that, it would appear vine-forcing was not then introduced into England, though it must have been very shortly afterwards."—*Rogers' Fruit Cultivation*, p. 208.

## CALENDARIAL MEMORANDA FOR AUGUST.

### KITCHEN GARDEN.

*Cauliflower*.—Seed should be sowed twice in this month, viz. on the twenty-first, and again on the twenty-eighth. These sowings furnish plants for spring crops of this favourite vegetable. It is necessary that the time stated for sowing be observed; because if sowed much before the first mentioned day there is risk that many of the strongest seedlings would "button" before the plants had arrived at sufficient size. And if, on the other hand, the sowing be delayed till after last mentioned-day, the plants do not yield flowers so early as they otherwise would do. (See the particulars of management in a preceding article of this number.)

*Spinach*.—For winter and spring use should be sowed twice in this month, if the first sowing has not been already made. The prickly seeded, as being the hardest, is to be preferred at this season. The ground should be well-dunged and dug for spinach; the larger the

leaves the more substantial and palatable they are when dressed. Some gardeners are at great pains in raising this vegetable; sowing it in shallow trenches in the manner of celery. A rank growth is thereby induced, but the crop is correspondingly tender; and will often be damaged by frost, when smaller plants on poorer ground, sowed in the common broad-cast way will escape. Scatter a few lettuce seed on the same ground.

*Cabbage*.—Sowing seed for the earliest crops of next spring must be done in the first week of the month. In the vicinity of London the market-gardeners sow in the last week of July; for, although a few of this sowing may “run away,” this they consider no loss, as the plants that stand are fit for market so much sooner. Sowing twice about the time above stated is a safe plan; and trusting more to the second than to the first sowing for the main crop, is the usual practice.

*Coleworts*.—Planting a good piece of these, if omitted, or too scantily done in the last month, may be done as soon as possible in this.

*Savoy, Brussels Sprouts, &c.*—Succession crops of these, and every other sort of winter greens may still be put out.

*Broccoli*.—Fourth or fifth succession crops of this useful vegetable should now be planted as directed last month.

*Endive*.—A last sowing of this may be made during the month. The quantity and state of the plants in last month's seed-beds will determine both the time and extent of this last sowing.

*Carrots*.—Sow carrots once more; they may be useful in the spring, if they have sufficient protection from hard frost through the winter.

*Onions*.—If Strasburg onions to stand the winter have not already been sown, this work should not be delayed latter than than the first week of the month. The ground should be rich and dry-lying; as moderate autumn growth renders the plants hardier, than if prompted into rapid growth by too moist a station in the first stage of their life.

*Lettuce*.—Sow the different sorts of lettuce on warm borders to stand the winter, either where they are sown or for transplanting into frames under glass.

*Celery*.—Succession trenches of this may still be planted; the trenches, however, need not be so deep as those made last month; as the growth will not be so vigorous.

*Turnips*.—May be sown twice in the month, in order to have a constant supply of bulbs in their greatest perfection.

*Parsley*.—This is a good season for sowing edgings or beds of this indispensable pot-herb; to sow the seed soon as it is ripe is a very old rule in gardening. The curled sort is most preferred by the cook.

*Radish.*—Both the common sorts and the black Spanish may be sown twice in the month. Also any other salad plants, as mustard, cress, &c.

*Mushrooms.*—If these be particularly wanted in October a bed should be made about this time. Prepare dung for beds to be made in September.

The general business in the kitchen garden is gathering crops as they become fit for use; such as peas, common and kidney beans, artichokes, cauliflowers, &c. Cleaning and earthing up all rowed crops, as broccoli, Michaelmas cauliflowers, cabbage, celery, &c.; blanching endive: gathering for storing, onions, shallots, garlic, herbs, flowers and seeds for dying. Guard seed-beds from birds, slugs, &c.; clip box-edgings and hedges; kill weeds, and remove every kind of decayed leaves, and rubbish from every part of the garden.

*Fruit garden.*—The grape vine, and all other fruit-trees on walls, require constant inspection. Supernumerary shoots or fruit may require to be displaced; and the leading and reserved shoots for next year's bearing, should be kept closely laid in; as well to prevent their being broken by the wind, as to assist the perfect ripening of the young wood.

Many sorts of fruits are now ripe or ripening; besides gathering for table in the early part of the day, the ungathered fruit will need constant attention to gather before they drop, and protection from birds, wasps, and other insects, as well as snails and slugs, which destroy much fruit as soon as it becomes set. The supplies of small fruit for the housekeeper's purposes are generally an ample drain; but the day of gathering of each sort should be fixed by the gardener, who ought to be the best judge when the greatest quantity can be had at one time; because, in all confectionary preparations, it is always desirable to have the whole that may be required, if possible, at once.

Keeping the ground under fruit-trees clean and smooth, very much assists the ripening and giving flavour to the fruit; the reflection of the sun's heat is particularly useful in this case. Retarding the ripening of small fruits, and thereby prolonging their appearance at table is a part of the gardener's duty. Some sorts of gooseberries, currants, plums, and morella cherries on north walls, may be covered with mats or other materials, (to repel flies and wet weather), and thereby preserve the fruit for a month or two after the usual season. Even the fruit on standard gooseberry and currant trees, if carefully matted, may be preserved in good condition for a considerable time. This memorandum comes too late, perhaps, for most of our readers in the south of the Island, but it may not be so for those in the north.

*Strawberries.*—This is a good time in which to make new planta-

tions of strawberries. If the runners have been previously prepared by laying them on rich compost, among the old plants, so much the better; otherwise, the best chance-rooted runners must be selected for the purpose. Much depends on the preparation and quality of the soil to insure the success and prolificacy of the strawberry plant. Some of the sorts, as the old scarlet and some others, require a stiffish loam: the hautbois a sandy loam: all should be planted in freshly turned up, and rather rich soil, though much strong dung is not necessary. The latest sorts still bearing, will require water if the season be dry. The potted plants intended for forcing should be often stripped of their runners. Much might be added here on the management and culture of this favourite fruit; but this had better be reserved for a separate article in some future number of the Register.

The first crops of melons have, by this time, yielded their fruit, and the second and third, whether within or out of frames, are coming on. Pruning the vines to increase the size of the fruit, and duly supplying with water, as the principal assistance required by the plants at this season. Cucumbers require similar attention; and if young plants of either have been previously layered and struck roots, these may be removed to new beds to give late crops.

If any fruit-trees have been lately budded and taken, they should be examined to see whether they want loosening; neglecting this often injures the junction of the bud and stock. If any budding is still to be done, it is not too late, provided the bark of the stock rises freely.

*Flower Garden.*—In this department the first thing of which the manager has to inform himself, is whether every thing directed or which ought to be done in the last month, has been performed. If not, it is not yet perhaps too late. Some bulbs may yet remain to be taken up; cuttings of azaleas, ericas, and every other like constitutioned plant may yet be put in. Those of less woody character, as dahlias, geraniums, carnations and pinks, &c. may still be struck. Roses may be budded; but this should not be done too soon, as early buds are apt sometimes to burst in the autumn, and so sustain damage from frost. Calceolarias intended to flower late, should now be pruned down, to cause the production of fresh flowering branches; at the same time they should receive a top-dressing of rich compost. Another bed of heart's-ease may be put out for a late bloom. Camellias intended to flower early should now be brought into the green-house, to forward their buds. Mignonette should be sown in pots or window boxes to stand the winter in frames. Cyclamen persicum should be turned out of the pots in which they have flowered, and placed in a border, to gain

strength during their torpid state. Chrysanthemums, whether in the house or out of doors, will require props ; dahlias which have advanced in height, as well as all other tall or climbing flowering plants, should have supports soon, or rather before they actually need them. Carnations, whether on stage, bed, or border, must be particularly attended to, in respect of propping, shading, &c., and layering them finished as soon as possible. Seedlings may now be bedded out. Shorten the first shoots of rose acacias, to cause a second birth of flowers in the autumn. If ranunculuses have been lately planted for a bloom in September and October, they will require to be kept rather moist, and the soil about them not too loose. Violets may be increased by division. Sow biennials, if any were omitted to be sown last month.

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### REMARKS ON THE WEATHER.

ABOUT the time of writing our remarks of last month, we had about London nearly a week's rain. This was of the greatest service to all growing crops ; but the weather soon after cleared up, and became settled dry, and for these last ten days remarkably hot, insomuch that many crops on thin sandy soils are evidently suffering ; and now at the edge of harvest every nurseryman and gardener are wishing for rain.

Notwithstanding the great heat of the days we have not been entirely free from night frosts : the tender leaves of many plants, even those considered perfectly hardy, as the larch and platanus for instance, have been discoloured or entirely killed ; and many other signs of frost, particularly among the Surrey hills, are very visible to the eye in travelling over that tract of country.

The fruit, flower, and vegetable markets are abundantly supplied with every thing that can be desired. Forced fruits have been remarkably fine and plentiful for months past ; and apricots, plums, peaches, and nectarines begin to make their appearance from the open walls. The earliest sorts of orchard fruit, such as the petit muscat pear, and Juneating apples have been on every stall for this week past. Melons, cucumbers, cherries, and other small fruit, are exceedingly plentiful, except strawberries, which are nearly over ; the plants in many situations drooping under the great heat of the sun.

This dry and warm July is most propitious for the wheat crop, as rust or mildew seldom assails that plant while the air is dry and warm ; and if no change takes place at the change of the moon reapers will soon be generally busy in the fields.

*July 25, 1835.*

PAXTON'S  
HORTICULTURAL REGISTER,  
SEPTEMBER, 1835.

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HORTICULTURE.

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ON THE CULTIVATION OF THE MUSHROOM.

THE mushroom is the only one of the cryptogamous or flowerless plants which have been brought into cultivation with success. Trials, we believe, have been made to domesticate both the truffle and morell, but without any decided advantage. The truffle is wholly subterranean; the roots and branches of the other two are also subterranean, but their eatable parts appear on the surface, or under very slight coverings of fallen leaves or herbage. The mushroom is produced spontaneously in open pastures, the others are inhabitants of woods. It is observable of the mushroom, that if the spring and summer be dry, and there afterwards fall frequent warm showers of rain, they appear in great abundance; but in opposite circumstances we observe the reverse. This circumstance is a direction to the cultivator, who keeps his mushroom-bed at first rather dry, and gives no water until the branches of the plant are sufficiently spread, and in a condition to bear the produce.

Mushrooms, like other plants, are re-produced by seeds called *sporules* by botanists. These are abundantly shed under the semblance of fine dust, and by the action of winds are transported far and wide, and wherever they fall in places or on substances suitable and favourable to their vegetation remain and come to perfection; hence they are often met with on old dung-hills, in stables, and cattle-sheds, where the decaying substances on which the plant luxuriates happens to have been protected from too much wet and frosty air.

These incidents, no doubt, first suggested the idea of the artificial cultivation of the mushroom, which is now brought to very great perfection ; and though the *propagines* or seeds are neither collected nor used by the grower, he is at no loss in obtaining what is called *spawn*, that is, parts of the plant itself, which, when planted on or in a properly prepared bed of due temperature, will be increased and quickly extended over a considerable surface, followed in due time by the fruit.

Spawn may be collected in pastures where mushrooms naturally grow, in horse-mill tracts, in cattle sheds, old hot-beds, or in old dung-hills, particularly along the sides which have been shielded from rain ; or spawn may be made by art, and which is done as follows :—Collect a heap of pure horse-droppings in the spring, either from the fields or stables, lay them in a shed till pretty dry ; of these make a conical heap, mixing therewith road-sand or other dry soil. Tread down and beat the sides as tightly as possible ; mind that the heap does not heat too much, which may be judged of from time to time by keeping a *watch-stick* thrust into the middle, which being withdrawn and felt by the hand will indicate whether or not it be of the right temperature, viz., about 58 degrees, a little more or less. If the heat be deemed too low a covering of soft hay or mats may be kept constantly or occasionally over, and if a due fermentation has taken place the whole heap will be a mass of spawn in five or six weeks.

An easier way of breeding spawn is by employing boxes about three feet long, about a foot wide, and deep filled *firmly* with horse-droppings, sandy earth, and some short rubbish hay got from under the mangers of cattle sheds. These boxes, set in a dry and moderately warm place, will soon have active spawn generated in them, and even bear good crops of mushrooms. Spawn may also be purchased at seed-shops.

Beds are made of different forms ; some, which are under roofs, whether light or dark, are built up square, others built sloping up against a wall, but the most general form is triangular, like the ridge of a house. The last shape is preferred for the open air, because rain or snow cannot penetrate through the covering so readily. Some make their beds against a paling, which has this advantage—if the heat declines too soon, which beds in the open air are liable to, the heat may be renewed by a lining of fresh dung applied to the back. In sheds, and sometimes in the open air, the bed is made over a flue, built for the purpose of renewing the heat when necessary. Some make very slight beds on the floor of a vinery or other forcing-house, or even in an old mekon frame, in which places very fine mushrooms are produced.



But in whatever manner the bed be made very much depends on the temperament of the dung employed in the construction. It should have a thorough preparation of at least three weeks before it is used ; this is for getting it all of uniform consistence and of similar quality as to dampness. If it be, when used, too damp, it heats at first too violently, and afterwards loses heat too soon ; and if too dry it never heats sufficiently, and sometimes not at all : but it had better be rather dry than otherwise, because a moderate heat is most lasting and most suitable for the crop.

The size of beds is regulated by the space allowed for them. If made against the back wall of a lean-to shed, four feet may be taken for a base, and a foot in height of this may be any kind of loose straw or dry rubbish of any kind which happens to be near at hand ; over this the prepared dung is built, and beaten pretty firmly with the fork, and carried slopingly upward, finishing about four feet from the ground. The bed may be immediately covered with mats to encourage fermentation, because the first heat must rise and be declining before any spawn can be planted, except the bottom row, which may be inserted on the third or fourth day after the bed is made.

The watch-sticks will indicate when the first heat begins to decline, and as soon as this is perceived the bed may be spawned half way up, leaving the upper half to be spawned about a week or ten days afterward. Too much caution cannot be used in spawning and earthing the bed, for it not unfrequently happens that the compact body of earth creates a new and excessive degree of heat, which will assuredly injure the spawn : better it is to spawn and earth up a few days too late than one day too soon.

The spawn should be inserted in morsels of about an inch or so square, and just put within the surface of the dung, about six inches apart, pressing the dung smoothly over them ; and if the heat has sufficiently subsided begin to earth the bed as high as it is spawned. Strong, rich, loamy soil is proper, and neither too moist, which would cause it to knead too firmly, nor so dry as to prevent its necessary adhesion. From one to two inches is the requisite depth of the covering of earth.

The next thing is protecting the bed by coverings. If in a shed, or under any roof, the coverings may be at first but slight ; or if in the open air, and the weather fair and mild, very partial covering will suffice, single mats may do ; but if the weather be cold and stormy a covering of clean wheat-straw next the bed, with mats over, will be required, and the colder the weather becomes the thicker the covering must be. In these cases the indications of a thermometer laid on the

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THE CHOICEST WAY OF BREEDING CHICKENS IS BY EMPLOYING HENS ABOUT THREE  
PER WEEK, LAYING A LOT WISE, AND THEY MUST FIRST BE WITH HARVEY-DROPPINGS,  
AND THEN THE WISE MUST BE TAKEN OUT OF THE HANDS OF THE MANGERS  
OF THE CHICKS. THESE BIRDS ARE IN A VERY AND MODERATELY WARM PLACE,  
AND THE WISE MUST BE TAKEN OUT OF THE HANDS OF THE MANGERS, AND EVEN BEAR GOOD  
CARE OF THEIR OWNERS. SPARKS MAY ALSO BE PURCHASED AT SEED-SHOPS.

Beds are made of different forms; some, which are under roofs, whether light or dark, are built up square, others built sloping up against a wall, but the most general form is triangular, like the ridge of a house. The last shape is preferred for the open air, because rain or snow cannot penetrate through the covering so readily. Some make their beds against a paling, which has this advantage—if the heat declines too soon, which beds in the open air are liable to, the heat may be renewed by a lining of fresh dung applied to the back of the sheds, and sometimes in the open air, that is, made a windward shed for the purpose of renewing the heat.

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that of a vinery, properly spawned and earthed, plenty of mushrooms may be had.

We might mention many other modes of growing mushrooms, which we have practised or assisted to practise in different places; such as growing them on shelves—in old hot beds after the crops of cucumbers or melons are off, &c. &c.; but enough has been stated to convey pretty clear ideas of the culture they require, as well as the means made use of for that end.

One other particular remains to be noticed, and that is respecting watering a mushroom bed. It appears, from what has been already advanced, that a very moderate degree of humidity is necessary to the plant in its early stages. In perfect dryness the plant, or its sporules, like seed, remains inactive though not dead; and by the application of a little moisture and mild heat such as is generated in the decomposition of vegetable substances, especially after passing through the intestines of animals, the plant becomes developed and progresses toward perfection, and while this humid state of the bed continues the plant will thrive; but if it becomes too dry the spawn falls asleep, and all production is at an end. When this is observed by the manager, he uncovers the bed and gives a pretty liberal watering, gently applied from a fine rose of a watering-pot. The water used should be soft and milk warm, and soon as enough is given the bed should be immediately covered closely with a somewhat thicker coat than usual. This will probably give a new heat to the bed and new life to the spawn, and recover its prolificacy. This business of watering must be repeated from time to time, but never unless the bed appears to need it.

In searching for mushroom spawn in places where it is likely to be found it is best detected by its scent, which is exactly like that of the perfect mushroom. The spawn of other varieties of the genus are often found with that of the true sort; but it cannot deceive the experienced eye, because it is different in appearance as well as in scent.

Mushrooms produced on damp beds, or on damp ground, are not considered wholesome, and therefore should be cautiously partaken of; and though there are two or three field sorts introduced into cookery, such as the champignon or “fairy ring” mushroom, they are all suspicious, and should be avoided unless recommended or declared innocuous by a medical botanist.

strength during their torpid state. Chrysanthemums, whether in the house or out of doors, will require props; dahlias which have advanced in height, as well as all other tall or climbing flowering plants, should have supports soon, or rather before they actually need them. Carnations, whether on stage, bed, or border, must be particularly attended to, in respect of propping, shading, &c., and layering them finished as soon as possible. Seedlings may now be bedded out. Shorten the first shoots of rose acacias, to cause a second birth of flowers in the autumn. If ranunculuses have been lately planted for a bloom in September and October, they will require to be kept rather moist, and the soil about them not too loose. Violets may be increased by division. Sow biennials, if any were omitted to be sown last month.

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### REMARKS ON THE WEATHER.

ABOUT the time of writing our remarks of last month, we had about London nearly a week's rain. This was of the greatest service to all growing crops; but the weather soon after cleared up, and became settled dry, and for these last ten days remarkably hot, insomuch that many crops on thin sandy soils are evidently suffering; and now at the edge of harvest every nurseryman and gardener are wishing for rain.

Notwithstanding the great heat of the days we have not been entirely free from night frosts: the tender leaves of many plants, even those considered perfectly hardy, as the larch and platanus for instance, have been discoloured or entirely killed; and many other signs of frost, particularly among the Surrey hills, are very visible to the eye in travelling over that tract of country.

The fruit, flower, and vegetable markets are abundantly supplied with every thing that can be desired. Forced fruits have been remarkably fine and plentiful for months past; and apricots, plums, peaches, and nectarines begin to make their appearance from the open walls. The earliest sorts of orchard fruit, such as the petit muscat pear, and Juneating apples have been on every stall for this week past. Melons, cucumbers, cherries, and other small fruit, are exceedingly plentiful, except strawberries, which are nearly over; the plants in many situations drooping under the great heat of the sun.

This dry and warm July is most propitious for the wheat crop, as rust or mildew seldom assails that plant while the air is dry and warm; and if no change takes place at the change of the moon reapers will soon be generally busy in the fields.

*July 25, 1835.*

PAXTON'S  
HORTICULTURAL REGISTER,  
SEPTEMBER, 1835.

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HORTICULTURE.

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ON THE CULTIVATION OF THE MUSHROOM.

THE mushroom is the only one of the cryptogamous or flowerless plants which have been brought into cultivation with success. Trials, we believe, have been made to domesticate both the truffle and morell, but without any decided advantage. The truffle is wholly subterranean; the roots and branches of the other two are also subterranean, but their eatable parts appear on the surface, or under very slight coverings of fallen leaves or herbage. The mushroom is produced spontaneously in open pastures, the others are inhabitants of woods. It is observable of the mushroom, that if the spring and summer be dry, and there afterwards fall frequent warm showers of rain, they appear in great abundance; but in opposite circumstances we observe the reverse. This circumstance is a direction to the cultivator, who keeps his mushroom-bed at first rather dry, and gives no water until the branches of the plant are sufficiently spread, and in a condition to bear the produce.

Mushrooms, like other plants, are re-produced by seeds called *sporules* by botanists. These are abundantly shed under the semblance of fine dust, and by the action of winds are transported far and wide, and wherever they fall in places or on substances suitable and favourable to their vegetation remain and come to perfection; hence they are often met with on old dung-hills, in stables, and cattle-sheds, where the decaying substances on which the plant luxuriates happens to have been protected from too much wet and frosty air.

These incidents, no doubt, first suggested the idea of the artificial cultivation of the mushroom, which is now brought to very great perfection; and though the *propagines* or seeds are neither collected nor used by the grower, he is at no loss in obtaining what is called *spawn*, that is, parts of the plant itself, which, when planted on or in a properly prepared bed of due temperature, will be increased and quickly extended over a considerable surface, followed in due time by the fruit.

Spawn may be collected in pastures where mushrooms naturally grow, in horse-mill tracts, in cattle sheds, old hot-beds, or in old dung-hills, particularly along the sides which have been shielded from rain; or spawn may be made by art, and which is done as follows:—Collect a heap of pure horse-droppings in the spring, either from the fields or stables, lay them in a shed till pretty dry; of these make a conical heap, mixing therewith road-sand or other dry soil. Tread down and beat the sides as tightly as possible; mind that the heap does not heat too much, which may be judged of from time to time by keeping a *watch-stick* thrust into the middle, which being withdrawn and felt by the hand will indicate whether or not it be of the right temperature, viz., about 58 degrees, a little more or less. If the heat be deemed too low a covering of soft hay or mats may be kept constantly or occasionally over, and if a due fermentation has taken place the whole heap will be a mass of spawn in five or six weeks.

An easier way of breeding spawn is by employing boxes about three feet long, about a foot wide, and deep filled *firmly* with horse-droppings, sandy earth, and some short rubbish hay got from under the mangers of cattle sheds. These boxes, set in a dry and moderately warm place, will soon have active spawn generated in them, and even bear good crops of mushrooms. Spawn may also be purchased at seed-shops.

Beds are made of different forms; some, which are under roofs, whether light or dark, are built up square, others built sloping up against a wall, but the most general form is triangular, like the ridge of a house. The last shape is preferred for the open air, because rain or snow cannot penetrate through the covering so readily. Some make their beds against a paling, which has this advantage—if the heat declines too soon, which beds in the open air are liable to, the heat may be renewed by a lining of fresh dung applied to the back. In sheds, and sometimes in the open air, the bed is made over a flue, built for the purpose of renewing the heat when necessary. Some make very alight beds on the floor of a vinery or other forcing-house, or even in an old melon frame, in which places very fine mushrooms are produced.

But in whatever manner the bed be made very much depends on the temperament of the dung employed in the construction. It should have a thorough preparation of at least three weeks before it is used ; this is for getting it all of uniform consistence and of similar quality as to dampness. If it be, when used, too damp, it heats at first too violently, and afterwards loses heat too soon ; and if too dry it never heats sufficiently, and sometimes not at all : but it had better be rather dry than otherwise, because a moderate heat is most lasting and most suitable for the crop.

The size of beds is regulated by the space allowed for them. If made against the back wall of a lean-to shed, four feet may be taken for a base, and a foot in height of this may be any kind of loose straw or dry rubbish of any kind which happens to be near at hand ; over this the prepared dung is built, and beaten pretty firmly with the fork, and carried slopingly upward, finishing about four feet from the ground. The bed may be immediately covered with mats to encourage fermentation, because the first heat must rise and be declining before any spawn can be planted, except the bottom row, which may be inserted on the third or fourth day after the bed is made.

The watch-sticks will indicate when the first heat begins to decline, and as soon as this is perceived the bed may be spawned half way up, leaving the upper half to be spawned about a week or ten days afterward. Too much caution cannot be used in spawning and earthing the bed, for it not unfrequently happens that the compact body of earth creates a new and excessive degree of heat, which will assuredly injure the spawn : better it is to spawn and earth up a few days too late than one day too soon.

The spawn should be inserted in morsels of about an inch or so square, and just put within the surface of the dung, about six inches apart, pressing the dung smoothly over them ; and if the heat has sufficiently subsided begin to earth the bed as high as it is spawned. Strong, rich, loamy soil is proper, and neither too moist, which would cause it to knead too firmly, nor so dry as to prevent its necessary adhesion. From one to two inches is the requisite depth of the covering of earth.

The next thing is protecting the bed by coverings. If in a shed, or under any roof, the coverings may be at first but slight ; or if in the open air, and the weather fair and mild, very partial covering will suffice, single mats may do ; but if the weather be cold and stormy a covering of clean wheat-straw next the bed, with mats over, will be required, and the colder the weather becomes the thicker the covering must be. In these cases the indications of a thermometer laid on the

mould of the bed should often be appealed to, and if it ranges between 54 and 60 degrees all may be considered safe.

If the spawn works kindly it may be discovered by moving the covering of earth here and there with the finger; and if small white threads appear in the mould it is a good sign. This will be visible in about three weeks after the bed is put up; and probably, after three weeks more, small mushrooms will begin to make their appearance on the surface, and the bed may then begin and continue to be productive for three or four months afterwards.

Success very much depends however on the state of the weather and attention bestowed in the regulation of the coverings. By these the due degree of warmth is maintained, without which the mushroom plant never prospers.

The market gardeners generally raise their mushrooms on beds in the open air, made in the ridge manner. They, no more than others, are always successful; but as their crops always fetch good prices at market the business answers, because it is only making a temporary use of the dung which they must have for other crops, whether used for mushrooms or not. Sometimes, when it happens that a bed is unproductive from losing its heat too soon, they renew the heat by covering the whole bed above the coat of earth with hot, well-worked stable dung, to the depth of about ten or twelve inches. This application causes a fresh fermentation in the body of the bed below, and then, when by this means produced, the borrowed covering is removed and the ordinary one replaced. This will often recover a sluggish bed and render it afterwards prolific.

As there is more uncertainty in the culture of mushrooms on very substantial than on slight beds, many practitioners prefer the latter to the former, and would rather have the trouble of making half a dozen small beds in the course of the year than two larger to serve for the same period. The spawn is oftener destroyed by too much than by too little heat. This may take place on a large bed, but it can scarcely happen on a small one. We have already alluded to the practicability of raising mushrooms in portable boxes filled with fresh dry horse-droppings tightly beaten in, planted with pieces of spawn also well pressed down, and then, when it has run through and taken possession of the dung, the whole be covered with about two inches of loamy earth well pressed together; and the boxes placed in a warm shed or cellar will produce plentifully if tepid water be allowed when the earth becomes too dry. This is certainly a very convenient method, and may be practised in almost any dwelling-house. So, by making a thin bed of worked dung and dry droppings on the floor of a warm shed, or upon



that of a vinery, properly spawned and earthed, plenty of mushrooms may be had.

We might mention many other modes of growing mushrooms, which we have practised or assisted to practise in different places; such as growing them on shelves—in old hot beds after the crops of cucumbers or melons are off, &c. &c.; but enough has been stated to convey pretty clear ideas of the culture they require, as well as the means made use of for that end.

One other particular remains to be noticed, and that is respecting watering a mushroom bed. It appears, from what has been already advanced, that a very moderate degree of humidity is necessary to the plant in its early stages. In perfect dryness the plant, or its sporules, like seed, remains inactive though not dead; and by the application of a little moisture and mild heat such as is generated in the decomposition of vegetable substances, especially after passing through the intestines of animals, the plant becomes developed and progresses toward perfection, and while this humid state of the bed continues the plant will thrive; but if it becomes too dry the spawn falls asleep, and all production is at an end. When this is observed by the manager, he uncovers the bed and gives a pretty liberal watering, gently applied from a fine rose of a watering-pot. The water used should be soft and milk warm, and soon as enough is given the bed should be immediately covered closely with a somewhat thicker coat than usual. This will probably give a new heat to the bed and new life to the spawn, and recover its prolificacy. This business of watering must be repeated from time to time, but never unless the bed appears to need it.

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Mushrooms produced on damp beds, or on damp ground, are not considered wholesome, and therefore should be cautiously partaken of; and though there are two or three field sorts introduced into cookery, such as the champignon or "fairy ring" mushroom, they are all suspicious, and should be avoided unless recommended or declared innocuous by a medical botanist.

## ON RAISING VINES FROM EYES OR SINGLE BUDS.

THIS is an old expedient for raising young trees, recommended by Miller, Speechly, and others. Every one acquainted with the vegetative powers and structure of the vine, can readily conceive that every bud having the smallest portion of the last year's alburnum and liber attached, will emit fibres, and develope the bud into a new individual plant.

As a bud with a piece of the wood is, next to a seed, the smallest living member which can be separated from a parent tree, it has been supposed to inherit more of the *purity of youth*, and less of any constitutional disease, or of any decrepitude from age to which the tree whence it has been taken may have been accidentally subject. Whether there be any well-founded reason for this supposition, so as to give cause for such a precaution, is difficult to guess, as it appears to be a practice rather based on an assumed probability, than from any positive proof or sign that the grape vine is subject to any constitutional disease, which is sought by this practice to be avoided.

Vines may be seen of all ages, some of them extremely old, and often in situations where they are exposed to all kinds of injury from domestic animals and mischievous boys, namely, in court-yards and on street-houses, cramped in their stems by close pavement, and at their root by hard beds of gravel, and all manner of builders' rubbish. Yet, notwithstanding these unfavourable accompaniments, we never see a diseased vine: it may be gnawed, browsed, and mutilated in every kind of way, but we never observe among those external injuries anything like internal disorganisation, as a cutting taken from the oldest and most disfigured stump will become as healthy a young tree as any cutting whatever. To propagate from eyes, to get rid of disease or the infirmity of age, therefore, seems a futile proceeding, and by no means productive of that superior soundness which the practice seeks to obtain.

But, say the advocates for striking vines from eyes, these trees are subject to be preyed on by several kinds of hurtful insects, and which may be transferred from old to young plants by taking large pieces of the shoots for either cuttings or layers. There may be some semblance of reason in this; but surely the red acarus, the thrip, aphid, or any species of coccus, are as likely to infest a plant raised from an eye, as from those raised in any other way. Again, it is argued that, whether a cutting or layer be used, a considerable part of the old wood must ever remain a part of the young tree; and if, like other trees, the oldest parts

of a vine fail first, the life of the young tree is unnecessarily shortened. But this argument has little weight, because a portion of old, or at least of the preceding year's wood is used in all cases; besides, we never see a vine die of old age, nor is it possible, if proper care be taken of the young shoots.

But there is another, and the strongest argument of all in favour of vines raised from eyes. It has happened that a very general notion prevails as to these being more valuable to the planter than others, and purchasers prefer such plants, if they are to be had. In this, as in all other matters of bargain and sale, the public fancy must be gratified, and therefore nursery-men provide the plants to satisfy customers. This is all very well.

The bark on the stem of an old grape vine has a very rugged and worn-out appearance; but this should never be allowed to accumulate under proper management. The outer bark is deciduous every third or fourth year; and nothing contributes more to the health and prosperity of the vine, than relieving it of its loose bark as often as is necessary.

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#### ON THE CULTURE OF THE EARLY VARIETIES OF THE GARDEN PEA.

EARLY peas are one of the luxuries of the garden, especially if they appear at table early in the month of May. Their earliness depends on the variety cultivated; on the suitableness of the soil and season; and, lastly, on the care bestowed in nursing the plants through the winter. They are a plant that cannot bear much forcing, by reason of their rambling growth, requiring much more space upwards than can be afforded in any kind of glazed frame, which would not be, at the same time, detrimental to the health of the plants.

To have them flower and pod as early as possible, it is necessary to sow in the autumn, and keep them growing slowly and well protected from the frosts of winter. The plant is not easily killed, if the situation be sheltered, and the soil sandy and dry. Peas are oftener destroyed by March winds than even by severe frost; and even farmers are in more dread of bleak winds than of the hardest frost.

Warm borders having a south aspect are invariably fixed on as a station for the earliest crops. In open situations, they are sometimes drilled on the south sides of ridges raised for the purpose. Whichever way of growing them be adopted, the process is so easy and well understood, that the subject scarcely requires a page in such a work as this,

were it not that there is one, though an old method of management, which, not being generally known, at least not very generally practised, deserves to be reiterated, more especially as it demands neither much labour, nor does it involve any risk or chance of failure.

About the first of November, provide as many open twenty-four-sized pots as, when plunged, will fill a three-light melon frame; fill them with old cucumber compost, or other similar kind of soil; divide each pot across the middle, by thrusting down pieces of broken glass, plain tiles, or pieces of flat board (old split oak pales cut to the proper length answer well); on each side of these dividers draw, with the two fore-fingers of each hand united, little drills about one inch deep: in these sow the peas moderately thick, but so as they do not lie on each other; cover equally, and plunge in the frame. Beginning at the back of the frame, (which should be set fronting the south,) keep up the surface of the pots to within eight inches of the glass; fill in the earth pretty firmly between and among the pots, to prevent the inroads of mice, slugs, &c. Place and keep on the lights till the plants break ground, and then give a little air daily, shutting close on nights.

This is all the attention the plants require throughout the winter, and until the time arrives when they must be turned out. No time can be fixed for this work, as it entirely depends on whether the winter has been mild or severe, or whether the spring is more or less advanced. Between the first and fifteenth of March is, however, about the usual time for putting them into their final station.

Close to the base of a south wall is the best place. Let about fifteen inches in width be forked up, (omitting opposite the stems or low branches of the fruit-trees,) laying the surface highest against the wall, to admit of a trench four or five inches deep being cut with the spade, to receive the plants.

The trench being ready, the pots of plants (the latter now about five inches high) are set along the border; the fingers of the left hand are introduced through both rows of plants; the pot is turned up, and its contents discharged into the left hand. The ball is next laid on the ground, and the blade of an old table-knife is passed through from side to side, close to the divider. The ball falls apart, and when the divider is removed, the divisions are placed in the trench nearly touching each other, their flat sides being put next the wall, so as to make a uniform row. Soon as the plants are placed, the roots may have a moderate sprinkling of water before they are covered up with the broken mould raised out of the trench. Soon as the surface is all neatly levelled, they must be stuck; this not only prevents the plants falling forward, but gives additional, shelter, and security.

Thus planted, and with so little damage being done to the roots, they scarcely feel their removal, (further than is necessary to hasten their flowering,) but commence growing, and soon reach the top of the sticks, which need not be more than about fifteen inches high, as early dwarf peas treated in this manner seldom rise higher. They will begin to show flower about the middle of April, and pods will be full about the first week of May, in ordinary seasons.

When wall-trees have any kind of covering for the protection of the flowers, if it also be made to project over the peas, it assists very much to expedite their early fruitfulness, and which, together with early sowing, moderate growth through the winter, their close union and confinement in the pots, and at last the slight check received when planted out, all combine to forward flowering.

Peas raised in pots, as above described, may also be planted in drills on open borders or quarters of the garden, care being afterwards taken that they be instantly sticked, and otherwise protected from being injured by wind. The very act of transplantation favours early fruitfulness, and is particularly evident, not only in respect of the pea, but also of the common bean, as well as of the different sorts of kidney-beans.

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#### COILING SHOOTS OF VINES.

THIS subject has been frequently before noticed in this Register, as well by Mr. Mearns, of Welbeck, the originator of the practice, as by Mr. Paxton and others.

It seems that the idea has been embraced by some of Mr. Mearns' brethren, and their masters, with much more confidence and trust in its efficacy than ever was intended it should have been by the inventor himself.

The idea is at least plausible; Mr. Mearns being well acquainted with the powers of the grape vine, and having often occasion to prune out fine, healthy, and well-ripened shoots, and which he knew, if left on the tree, would have produced much fruit, it was quite natural for him to have a wish to graft these shoots upon another root, or place them where they could form new roots for themselves. But he knew also that, whether grafted on a stock, or struck as a cutting, there would not be such a connexion in the one case, nor roots enough produced in the other, as would supply nourishment enough to so long a shoot, to enable it to yield even a single bunch. Mr. Mearns knew also that every part of the shoots, throughout their whole length, would, if laid

in good soil, produce roots, and that every bud would produce a shoot. It occurred to him, therefore, that by reducing the number of the latter, and increasing the numbers of the former,—that is, lessening the outlets, and enlarging the number of the inlets,—a sufficient portion of nutriment would be inducted, as would serve to excite and bring to perfection a small number of buds reserved for the purpose.

This appears to have been the leading idea, or train of ideas, which induced Mr. Mearns to try whether, by divesting a long well-ripened shoot of all its buds but two or three at the top, and coiling the dis-budded portion in a pot of good fresh soil, as many roots would be formed as would probably yield a few bunches of grapes in the first, and certainly a fair crop in the second year.

But, at the same time, the experimenter knew that, though, when the shoot was so placed, it should be put where it would receive the ordinary excitements of warmth and moist air, *it is not in a condition to be forced*. A very moderate temperature is at first necessary, because the shoot is rootless; and as fibres cannot be produced without a simultaneous expansion of the buds, the utmost moderation in the exciting causes is at first only requisite. If placed in the open air, it would, in the course of the spring and summer, eject a very numerous fringe of roots from every part beneath the surface, and the bud or buds in the air would burst, and grow away vigourously, though slowly; and though bunches would be developed, the fruit would not ripen. But for assisting the rooting, shooting, and perfecting a coiled shoot, suppose it to be placed in a mild hot-bed in the month of February or March, and receive such subsequent treatment as such a plant requires, the growth would be expedited, so that its shoots, leaves, and fruit would be as much matured as the condition of the plant in the first season would perform.

The French gardeners practise something similar with their young vines intended to be trained against walls or trellises. They conceive it of the greatest importance to increase as much as possible the number of roots near the surface, that is, within the influence of the air, as adding greatly to the prolificacy of the tree, as well as to the perfect ripening of the fruit. Instead, therefore, of placing the root close to the wall or trellis, as is commonly done, they place it at the distance of several feet, or as far off as the length of the stem allows, laying the latter in a shallow trench, bringing up the bearing shoots only on the face of the wall. The buried stem emits new roots along its whole length, and thereby increases the number of active fibres to assist the enlargement of the branches and fruit. Now, though this be practised on young previously-rooted plants, it is good management, in so far as

it increases the feeding powers of the plant. On the same principle, long shoots or cuttings laid down in the same manner would, like Mr. Mearns' coils, shoot with more strength than cuttings of one or two buds only would do, they being rather like layers than cuttings. It must be observed, however, that this occupation of the surface of the border, as practised in France, precludes raising any but light and shallow-rooting crops, such as small salad herbs and the like.

But wherein consists the utility of Mr. Mearns' invention? It has already been stated that it is a good method to obtain, in the shortest time, a larger body of roots than by the ordinary methods of propagating the vine. The ordinary methods of propagation contemplate raising plants to give fruit in the *second* and following years, whereas, according to Mr. Mearns, fruit may be had in the first. Where there are regular vineries, the plan of coiling shoots cannot turn to much account, unless, indeed, the demands for the table greatly exceed the supplies from the vineries: and if such demand be constant and pressing, an additional house would be much more convenient than depending on crops from coiled shoots. But supposing a case where there are no vineries nor forcing house of any kind, the owner having only a melon frame, and lights to spare, and be desirous of having a few bunches of grapes in the latter end of summer; and, moreover, can get from his open wall, or can beg of a neighbour, a dozen or two of long, well-ripened, rejected shoots; it might, perhaps, be worth the person's while to make hot-beds of dung to strike his coils, and ripen the fruit; and, granting that the return in the first year might be but small, yet, if gratified with only a few bunches, he would have the satisfaction of possessing a parcel of potted vines from which, by judicious hot-bed management, he might expect a plentiful return in the following year; and if consecutively forced in sets, would give a moderate supply of grapes for several months. Pine-apples are produced in the greatest perfection in hot-beds, and why may not grapes also? Knowing how much is done by the Dutch gardeners in this way, there need be no doubt but that potted vines, whether raised by coiling or otherwise, might be successfully fruited in hot-beds.

Considering coiling as only a new mode of propagating the vine, it deserves commendation entirely on the principle of it causing the production of a greater birth of radicles than either common layers or cuttings make in the first year, though it is notorious that layers of this year may be so treated as to bear plentifully in the next. Still the plan by which the greatest number of roots can be prompted into action from a young plant intended to be afterwards confined to a limited

space, and fruit expected from it in a short space of time, must be preferable to another which promises no fruit until a sufficient force of roots be formed.

It is understood that several practical men have tried coiling without success. This perhaps has happened in consequence of the essayist expecting more from the scheme than could reasonably be expected. If the coils were too short, or imperfectly ripened before they were severed from the parent tree, or if forced too early or too rapidly, no success could follow such attempts; and therefore it is not quite candid to scout the idea merely from the failure of a first trial; for although coiling is never likely to become a standard practice in the routine of gardening, yet, under some circumstances, and in some situations, it may be an useful auxiliary expedient.—ED.

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## LANDSCAPE GARDENING.

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### LETTER III.

SIR,—I spent the greater part of yesterday in strolling over what may be called the home walks, scenery, and gardens of my present pleasant abode. That you may have a clear idea of the house and its accompaniments, it is in the first place necessary to inform you that the whole occupies an area near the middle of the park of about ten acres, completely insulated, it appearing like an oasis comprehending the house and offices, pleasure ground, gardens, orchard, with their respective appendages. The great advantage of this arrangement is the freedom it allows for riding or driving round the place without the great annoyance of fences and gates. It also allows a freer view of the surrounding scenery of the park, distant country, and also the different animals with which the park is stocked, without stepping off the dressed walks of the pleasure ground.

A sunk fence divides the gardens from the park all round, except at two places, namely, the carriage road to the house and the cart road to the back offices and garden, both of which are arched over to prevent breaking the continuity of the pleasure-ground walk. In some places it is surmounted by a low rank of whitethorn and holly in passing through groups of forest trees planted partly within and partly without the upright face of the ha! ha! But where so planted it is not trusted to as defence against the entry of deer or other cattle; the height of



the brick-built face and the width of the fosse or graduated hollow without, being sufficiently protective against all intruders from the park side.

This kind of fence, although the most expensive at the first formation, is, however, ever after the best of all others. It is not only the least offensive to the eye, but it yields at all times an idea of security which is particularly pleasing to a proprietor. With what regret and poignant chagrin does an owner contemplate the damage done to his favourite trees and shrubs in one night only by the breaking in of a herd of cattle, occasioned by imperfect fencing; or for the sake of saving, perhaps, a few shillings per rod at its first erection. Nothing can compensate for such an error in planning a fence; or for any feeling of penuriousness in marring the execution of effective works. If any work of the kind be necessary every motive of prudence will urge the propriety of doing it effectually. Another thing, and which I am informed was the motive which designed and which justifies the expensive style and extent of the fence I am noticing, is the full command it gives of stocking the park with the most suitable and profitable live stock. A low or weak fence may be very well for sheep or small cattle (putting deer out of the question), but a garden or pleasure-ground fence should be effective against all cattle, even Hereford oxen and Leicestershire horses.

In such a place as this, indeed all places, according to the size of the estate, the domestic establishment, or rank of the possessor, have all their principal features of corresponding proportions to each other. The size and character of the house require so much garden and so much pleasure-ground; but the latter must not be uselessly large, nor should it encroach too much on the park. A place must not only be ornamental, it must be at the same time profitable; every square foot of turf is useful; and all that is wasted by hedges or unnecessary garden or pleasure-ground is unjustifiable extravagance. Ground planted with useful trees is at once ornamental and profitable, and when tastefully disposed adds more real value to the estate than by any other practicable means.

That portion of the estate of Fairfax Hall, whose area and mode of fencing I have endeavoured to describe, has been considered by the proprietors as duly proportioned to the park of four hundred acres lying round it. The station is a knoll, sloping gently from north to south, though not exactly so, as the longitudinal line is in a direction of about two points to the eastward of south. All the quadrangles of the offices, and cross lines of the yards, hot-houses, and gardens are parallel to the southward front of the house; thus giving uniformity and regularity to everything which should be regular.

mould of the bed should often be appealed to, and if it ranges between 54 and 60 degrees all may be considered safe.

If the spawn works kindly it may be discovered by moving the covering of earth here and there with the finger; and if small white threads appear in the mould it is a good sign. This will be visible in about three weeks after the bed is put up; and probably, after three weeks more, small mushrooms will begin to make their appearance on the surface, and the bed may then begin and continue to be productive for three or four months afterwards.

Success very much depends however on the state of the weather and attention bestowed in the regulation of the coverings. By these the due degree of warmth is maintained, without which the mushroom plant never prospers.

The market gardeners generally raise their mushrooms on beds in the open air, made in the ridge manner. They, no more than others, are always successful; but as their crops always fetch good prices at market the business answers, because it is only making a temporary use of the dung which they must have for other crops, whether used for mushrooms or not. Sometimes, when it happens that a bed is unproductive from losing its heat too soon, they renew the heat by covering the whole bed above the coat of earth with hot, well-worked stable dung, to the depth of about ten or twelve inches. This application causes a fresh fermentation in the body of the bed below, and then, when by this means produced, the borrowed covering is removed and the ordinary one replaced. This will often recover a sluggish bed and render it afterwards prolific.

As there is more uncertainty in the culture of mushrooms on very substantial than on slight beds, many practitioners prefer the latter to the former, and would rather have the trouble of making half a dozen small beds in the course of the year than two larger to serve for the same period. The spawn is oftener destroyed by too much than by too little heat. This may take place on a large bed, but it can scarcely happen on a small one. We have already alluded to the practicability of raising mushrooms in portable boxes filled with fresh dry horse-droppings tightly beaten in, planted with pieces of spawn also well pressed down, and then, when it has run through and taken possession of the dung, the whole be covered with about two inches of loamy earth well pressed together; and the boxes placed in a warm shed or cellar will produce plentifully if tepid water be allowed when the earth becomes too dry. This is certainly a very convenient method, and may be practised in almost any dwelling-house. So, by making a thin bed of worked dung and dry droppings on the floor of a warm shed, or upon

that of a vinery, properly spawned and earthed, plenty of mushrooms may be had.

We might mention many other modes of growing mushrooms, which we have practised or assisted to practise in different places; such as growing them on shelves—in old hot beds after the crops of cucumbers or melons are off, &c. &c.; but enough has been stated to convey pretty clear ideas of the culture they require, as well as the means made use of for that end.

One other particular remains to be noticed, and that is respecting watering a mushroom bed. It appears, from what has been already advanced, that a very moderate degree of humidity is necessary to the plant in its early stages. In perfect dryness the plant, or its sporules, like seed, remains inactive though not dead; and by the application of a little moisture and mild heat such as is generated in the decomposition of vegetable substances, especially after passing through the intestines of animals, the plant becomes developed and progresses toward perfection, and while this humid state of the bed continues the plant will thrive; but if it becomes too dry the spawn falls asleep, and all production is at an end. When this is observed by the manager, he uncovers the bed and gives a pretty liberal watering, gently applied from a fine rose of a watering-pot. The water used should be soft and milk warm, and soon as enough is given the bed should be immediately covered closely with a somewhat thicker coat than usual. This will probably give a new heat to the bed and new life to the spawn, and recover its prolificacy. This business of watering must be repeated from time to time, but never unless the bed appears to need it.

In searching for mushroom spawn in places where it is likely to be found it is best detected by its scent, which is exactly like that of the perfect mushroom. The spawn of other varieties of the genus are often found with that of the true sort; but it cannot deceive the experienced eye, because it is different in appearance as well as in scent.

Mushrooms produced on damp beds, or on damp ground, are not considered wholesome, and therefore should be cautiously partaken of; and though there are two or three field sorts introduced into cookery, such as the champignon or "fairy ring" mushroom, they are all suspicious, and should be avoided unless recommended or declared innocuous by a medical botanist.

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## MISCELLANEOUS INTELLIGENCE.

TO THE EDITOR OF THE HORTICULTURAL REGISTER.

SIR,—Excuse me for dictating to you, but I think it would be a great improvement if you would give representations of various insects which infest fruit-trees and vegetables; I think they would add to the value of your Register, and increase its list of subscribers amongst the lower orders. There are many insects at the roots of trees which are injurious, as well as a great many sorts of insects which would be the cause of the destruction of those trees were they not destroyed by lime, or some other substance, especially in soils which they call “made soils.” You very seldom find worms or other insects in soils which are new; but you will find them increase every year, which, I think, is occasioned by the increase of vegetable substance in that soil. There is a very disagreeable-looking insect,—I think it is commonly called a *centipede*,—which is very prevalent in made soils, and cannot, I think, be destroyed by lime.

I have ventured to make these remarks in almost total ignorance of the subject, but hope they will attract the attention of other correspondents of your very interesting publication. I think I could procure several different kinds of insects, and forward them to your publisher, if it would be of any use, and save you trouble.

Would you have the goodness to answer the following questions in your next number:—“Do you think insects might be destroyed on fruit-trees by any gummy substance mixed in water and poured over?” I think it would stick them to the leaf, and death must follow; and “What would be the best substance to dissolve?” Your obedient servant,

J. B. G.

July 2d.

[We thank our correspondent J. B. G. for his suggestions, which shall be attended to in future numbers. If he can conveniently send us the insects alluded to, we shall feel obliged, and will have them figured, if it will serve any useful purpose. The idea of using some glutinous wash is good, and shall not be forgotten.—ED.]

*Hop Branches, a substitute for Flax.*—After the hops are picked, cut the branches into strips of about three or four yards long, expose them to macerate in the dew for a few nights, then put them in running water, and afterwards dry them in the air. After this they must be crushed, and treated in the same manner as flax.—*Annales des Arts et Manufactures.*

The experiment is stated to have succeeded perfectly in France.

*On the Question whether the Publication of the successful or unsuccessful Practices of Gardening contribute most to the Improvement of practical Readers.*—It is often observed that the faults and fooleries of others operate more impressively as warnings, than the recital of success acts incentive to greater care and vigilance. There is a rankling sting and dread about the first, much more intense than any emulative feeling consequent upon the contemplation of the second. Hence it has been held, that if all failures, and the cause or causes of them, were faithfully recorded, much good would accrue, as such information would act like a beacon to guide inexperience along the safe path of practice.

But how can it be expected that the most candid writer could calmly sit down to publish his own errors? A sense of public duty is rarely so predominant as to induce a man to acknowledge voluntarily his own want of foresight, of care, or of skill. This, indeed, can hardly be expected; but, nevertheless, such reports would be very useful, and, to an ingenuous mind, a frank confession would leave no uneasiness, nor would it be any disgrace. Failures will happen, in spite of the highest talent, unceasing care, and the most consummate skill. This is a fact universally admitted, and therefore no odium can attach to a mere error of judgment, or to the occurrence of an event over which the superintendent had no controul.

In another point of view, the sooner professional errors are acknowledged, and even published, the better; because, if made in the management of wall fruit-trees, for instance,—as planting too deep, or in their disposition, as placing them too near together (these being permanent objects),—the error is sure to be detected sooner or later, and perhaps reported by visitors, from whom it always comes ungracefully, and too often unfaithfully.

It may be said, however, that if a man write at all, it will probably be of some successful exploit of his own; and if truly and minutely enough described, (and not arising from circumstances purely local,) it answers as well as if he had written of an unsuccessful experiment, because the latter may be inferred from the detail of his successful practice.

A great deal too much of this self-laudatory writing has, however, been admitted into periodical publications, particularly those of gardening and farming, and which has been very annoying to many persons engaged in such pursuits.

It may be remembered that, about forty years ago, all the world were *farming-mad*. The Board of Agriculture was in full operation; its Transactions were published in ponderous parts, containing communica-

tions written chiefly by farming gentlemen, or gentlemen farmers. The reports from every county in the kingdom were extravagantly inflated, giving most wonderful accounts of crops and culture unheard of before. No report was published that did not look well on paper, notwithstanding it was well known to practical men that never was there greater waste of farming means, nor never greater errors committed on the face of the earth, than by the gentlemen farmers about that time. Profitable proceedings were only deemed fit for the public eye; all was sunshine and golden opinions.

These reports, however, caused many broils between landlords and tenants, masters and servants; and though some good was done by exposing and banishing a few of the old customs and erroneous practices of old farmers, many expedients recommended by the Board turned out mere moonshine. One great misfortune to the cause of the tenantry about that time was—they had no writer of ability among themselves to show up the visionary notions of the learned agriculturists, and to keep the public mind steady respecting many of the marvellous results of new projects and practices reported in the Transactions.

When the Board was dissolved, the publication of the Transactions of course ceased; but a love for reading about farming continued, particularly in Scotland, where Kaimes' and Anderson's writings were disseminated, and explained and applied by the practical and periodical remarks of Brown, of Markle. These, together with the voluminous writings of the Rev. A. Young and others, brought literary agriculture into repute, and constituted it a considerable branch of the bookseller's business. Hence soon followed Farmers' Magazines, Journals, &c. &c., all of which found eager readers, while the business itself continued prosperous; but though the number of these periodicals has increased, subscribers have sadly diminished, few caring for anything written in them, except reports of the current prices of fairs and markets. These writings, however, have indirectly done much good, not only by diffusing a general knowledge of the practice, but also of the science of the business, and by inducing a desire of reading among a class of men who in general were very careless about whatever appeared in print.

Gardening has been less subject to be disfigured by erroneous or irrelevant writings than its sister art, not only because it is an employment more definite in execution, but also because its professors are more on an equality among themselves—is less invaded by amateur scribblers, and its practical excellences or defects more universally

known. This happens in consequence of their fraternal intercourse with each other, from the custom of the juniors passing from one celebrated place to another in pursuit of their business, and from their general character as reading men. This character gardeners have long enjoyed; and since gardening periodicals have been set going by the indefatigable Mr. Loudon, literary gardeners and gardening have very much increased. That such periodicals are serviceable to mankind in general, is undeniable: and though their contents are neither always new nor excellent, yet, among other things, they go far to answer the question at the head of these remarks; not, indeed, by the insertion of voluntary admissions of failures in practice by the unsuccessful practitioners themselves, but by the criticism of neighbours and tourists, whose communications, if candidly and courteously written for the sake of professional truth, are sure of a place in those periodicals.

Criticism on what is done, or omitted to be done by others, has often a snarling, carping kind of aspect, and too frequently gives offence to the parties or places pointed at, more especially in matters of taste. In this affair, every man has what he calls his own, and should certainly be allowed to enjoy it undisturbed, provided he does not impose it on others, or trump it forth as the acme of perfection. Censure on the want of space, or of high keeping in gardens, is much oftener caused by the want of means, than by the want of either taste or of propriety. Such circumstances are not legitimate objects of criticism; but on principles of practice, or of their right or wrong application, every one may exercise his own judgment, and freely canvass men and measures, as may appear to him necessary for banishing error, or for the maintenance of truth. This gives periodical publications, whether on arts or sciences, an inquisitorial character; and while kept pure from low abuse and frivolous petulance, raise them in the estimation of readers into a kind of tribunal, to which all will cheerfully pay a due deference.

Viewed in this light, periodical publications have a peculiar value. Any error which may creep into one number is pretty sure of being corrected in the next or some following one: and as refutation must be accompanied with some discussion *pro* and *con*, facts are elicited, or new ideas broached, which, but for the first mistake or misstatement, would have, perhaps, laid dormant for ever.

*To the Editor of the Horticultural Register.*

SIR,—Your readers are requested to refer to page 423 of the Horticultural Register for October last, and to page 115 of the number for



March, where they will find the first paper by W., and the reply of W. M. The following should have appeared in April or May.

*On the Germination of Seeds.*—I regret that W. M. has not endeavoured to refute the whole of my assertions; an appearance of unfairness would thus have been avoided. No one, having advanced an opinion, or asserted a fact, whether in conversation or in the pages of a periodical, likes to meet with a reply, professing to be a refutation of the whole, when half, at least, of the observations remain unnoticed. In the latter case, it is especially irksome; for, as the argument can be carried on by the two parties only, it perhaps becomes a source of annoyance to numerous readers, and occupies that space in the work which might have been far more profitably employed. I unwillingly extend this subject, but hope for the kind indulgence of the Editor and his readers while I add a few lines, which, had W. M. dealt courteously and candidly by my former observations, would have been unnecessary, and consequently would not have appeared. No one feels quite at ease under unmerited obloquy.

That "all seeds remaining on the surface inevitably perish," I, on my part, am prepared to contradict. W. M. adds, "some fall into a crevice in the earth, a worm-hole, or the burrow of some animal, or are trodden in by the feet of others." Undoubtedly *some* do so fall; but that is no proof that "those which remain above inevitably perish." In the dry autumn of last year, a neglected Capuchin lettuce plant in my garden, shed its seed during calm weather; rain was much wanted, but no rain fell; yet did that seed germinate, and come up *so thickly*, that not the point of a pencil could have been inserted among the innumerable little cotyledons which covered a plot of earth beneath the size of a vine leaf. There was, in this case, no room for "some to fall into the earth, or a worm-hole;" and certainly the profusion of young plants proved that none had perished on the surface. *This* I have seen. I have also seen sprouted wheat taken from the top of a wheat-sheaf; but W. M. wholly omits to notice the last-named fact, yet says I am labouring under as fallacious an opinion as, I suppose, the Editor of the *Encyclopædia of Gardening* to be.

How that can be fallacious which is obvious to every person during a warm, wet harvest, I own I am at a loss to comprehend. This wheat which I saw had never been near the ground from the time it was put into sheaves; some of that seed, therefore, had not "fallen into the earth, or a worm-hole," &c. Is this courteous, modest, just, or wise, to condemn a whole series of remarks as fallacious, which are open to the observation of the least attentive observer of nature, and of which

W. M. has not attempted the refutation of more than one or two, and succeeded in none? I repeat, W. M. asserts that "all seeds remaining on the surface inevitably perish." I readily give him credit for his observation, and believe such to be his real opinion; but he surely forgets that *very many* seeds possess no germinating property: this is known to all gardeners and planters, who frequently try the worth of their seeds by putting them into water. This is especially the case with those of the *melon*. The seeds, therefore, which W. M. says he has observed in the forests in a state of decay, were the husks, doubtless, that contained no vegetating principle. Is it possible that W. M. has never tried the experiment of growing mustard and cress on a moist flannel by a kitchen fire? He will not, surely, conclude that all who have done so, entertain opinions equally fallacious with myself. I sincerely wish I were a practical chemist, and could offer an opinion upon the theory which W. M. so judiciously proposes \*, and should be equally pleased with himself to see the subject scientifically discussed. I know so much only of the noble science as to enable me to admire its results, and to regret that it should be brought forward where I see no reason for its introduction. For instance, the "Encyclopædia of Gardening" says, "*seeds will not germinate in the light, because light decomposes the carbonic acid gas, expels the oxygen, and fixes the carbon, thus hardening all parts of the seed, and preventing vegetation.*" How can I reconcile this round assertion with the fact of the sprouted wheat, for example? *this germinated in the light*; therefore the light had *not* decomposed the carbonic acid gas; it had *not* expelled the oxygen; it had *not* fixed the carbon, nor had it hardened all parts of the seed, and prevented it from germinating.

I am, I repeat, sorry to occupy this space in the Register so unprofitably; but I hope to find an excuse with all readers who may dislike to lie under an imputation of ignorance or presumption. I hope I shall not intrude again. I have certainly no wish to do so. W.

July 25th.

*On the black Lisbon Grape*, by William Bristol, gardener to Charles Huit, Esq., Wirksworth, Derbyshire.—I have frequently felt sorry, on going into most hot-houses, to see the bunches of this grape so deficient—to find here and there a good full-sized berry, and all the others small and good for nothing, or missing altogether. I have for a number of years practised the following plan, and always found it to answer

\* Since the above was written, I see that the subject *has been* ably and satisfactorily treated by one of the contributors to this work, at page 131 of the April number.—W.

well. The bunches, when attended to as stated below, have invariably been equal in size, and perfect.

When the trees are in flower, take a bunch of any of the black sort and dash it against the Lisbon, so as to impregnate it. The consequence is, that this grape will, by my plan, set, and be as perfect in its bunches as any other sort.

*August 11th, 1835.*

[We quite agree with Mr. Bristol, that his treatment of the Lisbon grape is feasible, and deserves to be followed, not only with the Lisbon, but with several other sorts that are often deficient in the size of berries.—ED.]

*On saving Liquid Manure*, by G. T. Dale, Wirksworth, Derbyshire.—No branch of economy has been more neglected than this, though the attention of farmers and horticulturists has frequently been called to it. I remember some years ago, when I was a boy, being for some months at a farm-house, where there was a spacious farm-yard. The whole of the valuable liquid from this yard was suffered to run away, and was lost in the ditches. After some time, a part of the wall surrounding the yard, being undermined by the drainings running under it, fell down. I then asked the farmer if it would not be a good thing to have a mew or cistern to collect it, instead of allowing it to run across the road as it had done for years. The answer I got was, "It did not much signify;" and the wall was repaired. Our English agriculturists are, in this respect, certainly not quite so sharp as their neighbours on the continent, where all drainings from their dung-hills, stables, cow-houses, &c., are collected into a reservoir. Our farmers can certainly be little aware of the expense and trouble they might save themselves by attending to this. Many, I have no doubt, will say, "But look at the expense to begin with." I will engage to prove that the expense of constructing the reservoir shall, in a very small farm, be paid three times over the first year. It is really lamentable to say, but nevertheless true, the system generally pursued is quite the reverse of what it should be.

At what expense do many agriculturists procure their manure, when all this expense, labour and trouble might be saved by a little management. Mr. Stafford, who has written much on this subject, is of opinion that four barrowsful of new manure, properly fermented and reduced to a liquid state, are sufficient to manure half an acre of land. The drainings from stables, &c., when properly fermented, is by far the most powerful manure we have, either for farming or garden purposes.

How strange this valuable article should so generally be suffered to run to waste. There is no vegetable matter which, if properly managed, with the help of this liquid, may not be reduced to excellent compost.

For want of paper, I must, Mr. Editor, conclude, and shall be glad to go further into the matter in your next.

August 11th, 1835:

SIR,—In your June number for this year, Mr. Ashford requests information as to the cause, prevention, and cure of the spotty and finally mouldy state of some of the berries in bunches of grapes. I am not technically acquainted with the botanical terms proper to be employed in my inquiries; but in my vinery, in which I have no flue, I am much annoyed and disappointed by the decayed and *burnt* appearance of many of the sprigs—or perhaps the proper word may be foot-stalks—from whence my berries proceed. They thus become red, instead of being black, and sour, instead of being sweet; and the whole stalk speedily decays, and the fruit falls. If this was general, I should attribute it to a bad border, too much or too little heat or air; but it is partial, only affecting some bunches, while others are quite healthy.

I also solicit from yourself, or some correspondent, the cause, prevention, and cure of this disease, or bad gardening.

August 17, 1835.

JOHN MILLS.

[As the defect described by Mr. Mills appears to be only a partial failure, it is extremely difficult for us (as strangers to the general condition of the vines) to name the cause of this failure. We can only surmise whether there may not be *too great* a crop on the vines, or whether they may not be suffering from the want of moisture at the root, or, more probably still, from the great heat of the sun, in this unusually hot summer.—ED.]

*Historical, &c. Remarks on Tobacco.*—There are about thirty species of *Nicotiana*, and some of these are natives, or naturalised, in most parts of the world; for although its use was unknown in Europe before the discovery of America, indulgence in its fumes is so common, nay, so universal among the Chinese, and the forms of their bamboo pipes and their method of exhaling so peculiar, that Pallas and many others have been led to believe that the custom is aboriginal with them, and that they and other nations of the East were acquainted with its use before the discovery of the western hemisphere. Two or more species, *N. sinensis* and *N. fruticosa*, are also believed to be natives of China, and *N. nepalensis* of Hindostan. Chardin states that its use

was common in Persia long before the discovery of America, and that it is a native of that country, or at least was naturalised there as early as 1260. Furthermore, Liebault asserts that one species (his "*petit tabac sauvage*") is a native of Europe, and that it was found wild in the forest of Ardennes previous to the discovery of the New World. This assertion seems, however, to be deficient in proof, and its correctness is doubted by most naturalists.

The history of tobacco is one of peculiar interest. It was first introduced into Europe about 1560, seeds being sent by Jean Nicot, from whom it derives its generic name, to Catherine de Medicis; but it was not till 1586 that the use of the herb became generally known, and the practice of smoking introduced into England by Sir Walter Raleigh and the settlers who returned from Virginia. Hariott, who accompanied the expedition which was sent out to attempt to found a colony in Virginia, gives, along with a description of the tobacco plant, an account of the manner in which it was used by the native Americans, and adds, that the English, during the time of their stay abroad, and since their return home, were accustomed to smoke it after the fashion of the Indians, "and found many rare and wonderful experiments of the virtue thereof."

Like coffee and Peruvian bark, tobacco encountered violent opposition, when its half-inebriating and soothing influence recommended it to popular use. Many governments attempted to restrain its consumption by penal edicts. The Sultan Amurath IV. forbade its importation into Turkey, and condemned to death those found guilty of smoking, from a fear that it produced barrenness. The Grand Duke of Moscow prohibited its entrance into his dominions. The Shah of Persia, and other sovereigns, were equally severe in their enactments; and Pope Urban VIII. anathematised all those who smoked in churches. But not only legislators, but philosophers, or at least book-makers, entered into a crusade against tobacco. Upwards of a hundred volumes, the names of which have been preserved, and the titles catalogued, were written to condemn its use; and amongst these, not the least singular, was the "Counter Blaste" of our pedantic James I. His vituperations are, indeed, most amusing, and the language gross; but the tenor of them may be judged of from the banquet which he proposed for the devil, viz. "a loin of pork, a poll of ling, and a *pipe of tobacco*."

Of the sincerity of the royal anti-tobacconist there can be no doubt, if any reliance may be placed on energy of expression, and on his almost unequalled force of language. But, notwithstanding all opposition, smoking and snuffing prevail, not only through polished, but savage

countries; and instead of being scorned and contemned by strangers, and wondered at by all "forreine civill nations," the English now are countenanced, nay, not only equalled, but exceeded in the custom by many other people; for during the reign of George III., the practice of smoking declined in this country, although since the peace it has been again, in some part, revived.

Smoking is now a universal habit; every nation on the continents of Europe and America, as well as over all the East, are addicted to the pipe or cigar. Young and old, grave and gay, rich or poor—all enjoy, or seem to enjoy, the amusement of smoking. Such being the facts, putting all prejudices aside, we believe the pleasurable sensations which the slight stimulus of a pinch of snuff gives rise to, the composing influence of a cigar, the calmness and satisfaction it produces, and the temporary happiness of which it is the cause, are the best arguments in defence of the practice: indeed the discontinuance of that which so materially increases the sum of human happiness, would be greatly to be deplored.—*Burnett's Botany.*

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#### NOTICES OF WORKS ON BOTANY.

OUTLINES OF BOTANY; *a Sketch of the Linnæan Arrangement of Plants, with Tables to illustrate the Distinctions of Genera and Species: to which are added, Hints for the Management of a small Garden.* By R. B. Stewart, Esq., pp. 72. Ridgway and Sons, Piccadilly, 1835.

Botany is becoming more and more a fashionable study, and particularly among ladies and their young children. But all the best introductions to the science are so voluminous and recondite, that they are to young students perfectly appalling. To render the study less laborious, and to meet the wishes of those who only intend to gain a competent, though not a profound knowledge of it, several very small tracts have been published, under the titles of "First Steps," "Outlines," "Alphabets," &c. The neat little volume before us is one of these; and if brevity and perspicuity united have attractions for the class of students above alluded to, this performance will certainly meet a favourable reception. It treats of the Linnæan system only, and in the plainest manner; and we venture to say the author will not be disappointed in what he "ventures to hope, that the manner in which he has arranged

the rudiments of the science, may be found to facilitate the progress of the young beginner."

To the botany are appended several useful lists, and some very good observations on town gardens, which will be very useful to those who are lovers of plants, though perhaps neither gardeners nor botanists.

OUTLINES OF BOTANY, *including a general History of the Vegetable Kingdom: in which Plants are arranged according to the System of Natural Affinities.* By the late Gilbert T. Burnett, F.L.S., Professor of Botany in King's College, London, and senior President of the Westminster Medical Society. In two volumes. Churchill, Soho; London.

These two volumes contain a great and valuable body of botanical knowledge and interesting information, and comprise the substance of the learned author's lectures, delivered at the King's College. The work may be called a compendium of all the best-established facts or opinions held by the higher ranks of scientific botanists of the present day, relative to the natural affinities of plants.

As a teacher of botany, he adopts the plan of synthesis, rather than analysis: he begins with the lowest grade, and ascends to the highest, instead of the contrary, as has been done by other teachers. This is certainly reasonable, though it is objected to as inconvenient, because the lowest grade of vegetables are microscopic, and cannot so readily be referred to by beginners as the grosser growing kinds.

In writing a new book on a science which has been previously treated of by many others, an endeavour is almost always made to give it somewhat of a new character, or bear about it some marks of originality. This is the purpose of every author before he puts himself in the printer's hands; and here we certainly have some new features, more especially in the Glossology, heretofore called Terminology. Newly-invented terms may be strictly scientific, and perfectly accurate, and, moreover, might be particularly useful to the students of the author's own school; but their usefulness to botanists in general is perhaps questionable, merely because they are changes. If, on the other hand, we consider botany as an improving science, and meet with new terms which are more comprehensive, or have an aim at concentration, we cannot withhold approval. Whatever may be thought of the new titles adopted by the author, we feel bound to say that the work is replete with excellent matter, and with many profound philosophical views. To the medical student it will be a valuable directory; and even to the general reader, a fund of very varied information. And

though the hand that wrote, and the head which arranged the matter of these volumes now lie mouldering in the dust, the work will remain a monument of the extent of the author's researches in natural history, and a lasting memorial of his name.

PLANTS FIGURED AND DESCRIBED IN THE FOLLOWING PERIODICALS FOR AUGUST, 1835, viz.

EDWARDS'S BOTANICAL REGISTER, continued by Dr. Lindley, contains—

1. *Myanthus barbatus*. Bearded Flywort; a curious orchideous plant, a native of Demerara, discovered by Mr. Henchman; which since its introduction into this country has flowered with Mr. Lowe of Clapton; soon afterward at Chatsworth, and also in the garden of Mr. Willmore, near Birmingham.

2. *Dendrobium cupreum*. Copper-coloured Dendrobium. Another very fine flowering plant, belonging to the order *Orchideæ*. This plant was received from India by the Hon. and Rev. W. Herbert, about ten years ago, and flowered last year for the first time. Of the Dendrobium a curious circumstance is mentioned, and which will be received as a strong corroborative proof of the newly-received doctrine of vegetable morphology. Mr. Herbert adds to the description of this plant,—“It is curious that these Dendrobiums, if they miss flowering, put forth a young plant, instead of a spike of flowers, at the point of inflorescence;” so that it appears young plants and flowers are transmutable into each other.

3. *Lasthenia glabrata*. Smooth Lasthenia. A new hardy annual from California, introduced by the Horticultural Society. It belongs to *Syngenesia*, “and forms a pretty gay mass of yellow in the beds of the flower-garden.”

4. *Angræcum distichum*. Two-rowed Angræcum. Another minute growing and flowering orchideous plant, a native of Sierra Leone, introduced by Messrs. Loddiges.

5. *Dyckia rariflora*. Scattered-flowered Dyckia; a hexandrious perennial, belonging to the natural order *Bromeliaceæ*. A South American prickly-leaved plant, of the aloe character, with spikes of dark yellow and rather handsome flowers.

7. *Empetrum rubrum*. Red Crowberry. Is a hardy evergreen shrub, and, “though not very striking in appearance, is a valuable addition to the hardy shrubs of this country.”

7. *Eutoca divaricata*. Straggling Eutoca. A new annual from California, flowering in May and June, but of no great beauty.



**SWEET'S FLOWER GARDEN**, edited by D. Don, Esq., contains, in the August number, as follows, viz. :—

1. *Pæonia moutan*; var. *punicea*. Red flowered tree Pæony. A splendid seedling from the collection of Sir Abraham Hume, Bart., of Wormleybury; a most desirable addition to this already numerous tribe of Chinese plants.

2. *Viola cucullata*. Hollow-leaved Violet. A hardy North American plant, introduced about 1772. It is easy of culture and propagation.

3. *Eschscholzia crocea*. Saffron-coloured Californian Poppy. This is a remarkably showy plant, resembling its congener, the *Californica*, but having rather larger flowers. It is a biennial, of easy culture.

4. *Cratægus Mexicana*. Mexican Hawthorn. A new and distinct species, introduced by Mr. Lambert in 1829, and flowered and bore fruit for the first time in 1834. The flowers are showy, and the fruit are as large as pigeons' eggs.

**PAXTON'S MAGAZINE OF BOTANY**, for August, contains the following plants, viz. :—

1. *Azalea Indica*; var. *Smithii*. Smith's new hybrid Azalea. Among many seedling varieties raised by Mr. Smith of Norbiton Common, this is one of the most showy, the flowers being large and high-coloured.

2. *Bletia Shepherdii*. Shepherd's Bletia. An elegant orchideous plant, a native of the West Indies. It was called *Limodorum* by Linnæus, but separated and renamed by Ruiz and Pavon. This species bears a spike of fine purple flowers.

3. *Arbutus procera*. A hardy shrub or tree, introduced into this country by the late Mr. Douglas, who found it on the west coast of America.

This number contains also some valuable remarks on the culture of *Orchideæ*.

**SMITH'S FLORIST'S MAGAZINE**. This new work commenced lately, and is designed expressly to meet the increasing taste for florists' flowers. It professes to give figures of all the first-rate flowers cultivated, and at present so much regarded by the professional and amateur florists; and by the faithful and superior style in which the plates are executed, the full descriptions and directions for the culture annexed, and the respectable style in which the whole is got up, the work cannot

fail to meet the encouragement it deserves. This Magazine will, moreover, be an efficient means of giving publicity to that *peculiar taste* which at present is entirely engrossed by florists, and of which the public generally know but little.

The number for August (which we believe is the second) contains, *Rose Tourterelle*, and *Rose celestial*; *Duke of Sutherland Dahlia*; *Pandora Tulip*; and two Carnations, viz. the *Duke of Devonshire* and the *Queen of Sheba*.

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## CALENDARIAL MEMORANDA FOR SEPTEMBER.

### KITCHEN GARDEN.

**Mushrooms.** This is the season in which beds are made for the artificial production of this vegetable during the winter months. See directions given in a preceding article of this number.

**Spinach.** If the winter spinach sown last month has risen well, the crop will require weeding or hoeing among some time in this. Set out the plants four or five inches from each other; and if their growth be checked by drought, a good soaking of water should be given, to get them sizeable before the cold nights set in.

**Cabbage.** The seedlings for the principal crop of next spring will be, before the middle of this month, fit for pricking out into nursing beds, to gain strength and stockiness before they are finally planted out in October. Choose an open situation, of good, rich, well-dug ground, laid out into narrow beds, on which the seedlings may be dibbed four inches apart, and immediately watered, to assist their striking fresh roots. The quantity must be regulated according to the demand of the family, always, however, with an excess rather than otherwise. The Coleworts sown in July, if not already planted out, should now be placed where they are to remain for supplying the table in winter and spring; and if there be vacant ground to spare, any sort of winter greens, as Scotch kale, Brussels sprouts, &c. may still be planted.

**Broccoli.** A last succession crop of broccoli may be planted in the first week. If they survive the winter, they may yield heads at an acceptable time.

**Endive.** The full-grown plants will require tying up, and blanch-

ing as needed, and the younger crops keeping clean, and perhaps watering.

*Lettuce.* Continue transplanting lettuce into warm situations, where they may have the best chance of growing during autumn, and withstanding the frost of winter. A little more seed of sorts may be sown, to be nursed in frames.

*Celery.* Where the previously planted trenches of this plant are growing, occasional earthing up will be necessary, and, as the summer has been dry, frequent watering.

*Turnips.* The last sowed crops must now be thinned, and kept clean by the hoe. If former crops have failed, it is not yet too late to sow, more especially if it be a dripping season. Small-sized turnips are as much, or more valued at table than larger ones, being, if young, more tender and delicate in flavour.

*Salad plants,* such as common radish, cress, mustard, rape, may still be sown on warm and sheltered situations, where, if the autumn be favourable, they will have the best chance of succeeding.

The general labour of this month is care of all the growing crops, some of which will require the hand or hoe to keep clean, the hoe or spade to earth up, and the watering-pot to encourage growth. Kidney-beans and cucumbers now in full bearing require much water, particularly if the weather continue dry and warm. Cardoons may be tied and earthed up. Artichokes, if all gathered, should have their stems broken down. Bulbs, as shalots, garlic, &c., should be taken up, if not already done. Herbs should be gathered for drying, and ripe seeds secured.

**FRUIT GARDEN.** — The principal business here is taking care of the ripe and ripening fruit. All perfectly ripe fruit intended for immediate use should be gathered early in the morning, and kept in the coolest part of the fruit-room till wanted. Flat and wide baskets, the bottoms covered with leaves, the softest white leather gloves, and an attendant to carry the basket, are necessary in gathering the finest wall-fruit. Apples or pears intended to be kept for a few days, or for any length of time, should be gathered just before they are fully ripe; this makes them less susceptible of bruises, and consequently keep longer. Guarding wall-fruit from wasps, flies, and other insects, requires attention. Destroying wasps' nests near the garden, hanging up phials of sweetened water, and placing bean or other hollow stalks about the trees, are the only means for alluring and capturing these pests. Grapes are sometimes defended by gauze or paper-bags; but for stone-fruit this is not so easily done.

Wall fruit-trees still require looking over, to displace superfluous shoots, and keep the leaders close to the wall. If the crop of peach-houses are over, expose the trees to the open air; and if insects have attacked them during the ripening of the fruit, they should be well and repeatedly drenched with water or soap-suds. So all trees on the open walls suffering from insects, should be often and forcibly washed with the engine. If fruit drop from the tree before it is ripe, it is an indication that the tree is in want of water at the root; this defect admits of a certain, though a laborious remedy, viz. watering the borders.

Strawberries planted or potted last month, will require copious watering to keep them improving, before the cold of winter sets in to check their growth.

FLOWER GARDEN.—The flowering plants of the stove, the greenhouse, and conservatory, as well as all those in the borders, beds, or on the stages of the flower garden, all require particular attention in watering, propping, and perfect cleanliness. Decayed flowers, stems, and leaves should not be seen, far less weeds, or any irregularity of growth, which would convey an idea of wildness or neglect. If there be any seedlings of biennial or perennial flowers too crowded, they should be thinned or transplanted. If slips, cuttings, pipings, or layers are sufficiently rooted, they should be removed to the beds or borders where they are intended to flower, or planted in pots, as the case may be. Carnation layers and pink pipings require particular attention, as well as all other sorts raised in the same way, and intended to flower next year. Auriculas should be freed from dead leaves, the surface of the pots freshened up, a little fresh compost added, and if any require shifting, it may now be done. The seeds of anemones, ranunculuses, &c., may still be sowed in pans or boxes, if not done last month. Dahlias are now in full beauty; and the Chinese chrysanthemums, whether in pots or in the open air, require frequent watering, and not only at the root, but over the leaves; the latter, though quite flaccid by the sun's heat, quickly revive on being sprinkled with water. Seeds of fine annuals, or other flowering plants now ripe, should be gathered and saved. As the time is coming on for housing the greenhouse plants, the house should be got ready in time for their reception. Of late years, indeed, we have had scarcely any frost before Christmas; but there is no trusting to the weather in this changeable climate. We have known greenhouse plants killed, and many seriously injured by frost which happened on the 5th of September, we think, 1794 or 5. Better it is, therefore, to be too soon than too late, especially as the

plants may have full air given after they are housed. A good many of the plants may require shifting at this time, and for doing which the necessary provision of pots, mould, &c., should be made, in order that any work of the kind may be finished expeditiously. Nothing looks worse than to see a collection of green-house plants standing about in disorder for several days together. When, therefore, such work is to be done, it is best done quickly.

It is now the proper time to prepare the beds intended for tulips, hyacinths, ranunculuses, &c., in order that they may be properly settled by planting time; and, indeed, much of the beauty and order of a flower garden in the next season depends on the preparations and dispositions made at or soon after this time, whether it be in improving the quality of the soil, or in altering the forms of the beds. Improvements in these respects are almost always practicable even in the highest finished gardens. Many such places continue to wear the same face for years and years together, and thereby become tame; not because the manager cannot make judicious alterations, but merely because he does not happen to think of it. We do not mean that the face of a flower garden should be ever shifting, like the figures in a kaleidoscope, by which

“Nature’s corpse at Euclid’s feet is laid;”

but by removing overgrowths, enlarging some features, and reducing others; or by division, to give greater variety, such pleasing changes may be made, as would make the place much more interesting than a constant semblance of the same forms can possibly do.

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## REMARKS ON THE WEATHER.

It very seldom happens that, in this changeable climate, a periodical writer has to report of so long a continuance of dry and extremely hot weather as has been experienced during these last six weeks. The utility of such reports may be questioned, because they can only relate what a great part of the people of the three kingdoms already know. This is certainly true; but as situation, elevation above, or proximity to the sea, and quality of the soil and subsoil of each particular locality, make great difference in the effects of drought on vegetation, these differences deserve special notice, as some of our readers may be affected much more than others at a very short distance apart, and the first,

perhaps, accused of neglect, while the second is bepraised for what is erroneously deemed superior management. The fact is, the advantages of situation are not always apparent to the eye; nor are all plants equally affected by the state of the weather. Deep-rooting plants, as the beet and others having spindle-shaped roots, are scarcely checked by the present dry weather, while the fibrous or shallow-rooting herbs are burnt up. We visited a garden the other day in which we were struck with the verdant and vigorous appearance of the trees, both on the walls of the garden (which were also covered with fine fruit) and in the pleasure-ground, while every shallow-rooting vegetable and flowering plant on the surface were diminutive, and only kept active by the watering-pot. The surface was everywhere cracked, and rent by wide fissures, and presented a most barren-looking aspect. "What is your subsoil here?" was a natural question. "A fine moist bed of clay," was the answer, and which sufficiently accounted for the difference in condition of the trees and herbs. On the following day we witnessed the effects of the drought on another highly ornamented place, on which every tree and herb were languishing. Some of the trees, especially where they stand thickly together, have already lost their leaves, and many, elm, ash, and poplar, will hardly recover. Here the subsoil is *a bed of gravel*. The nearness or distance of the land-springs from the surface also very much affects the growth of vegetation; and the great advantage of trenching ground for any kind of crop, has been particularly manifest this summer. Opening the ground to allow the escape or ascent of moist vapour from below, is of the utmost benefit to the thirsty and parched plants on the surface.

Orchard fruit are rather plentiful, but remarkably small in consequence of their numbers and dry weather together. The potato crops in the fields, which are not yet quite ripe, will be in some jeopardy should we have a sudden fall of rain, and which, if not immediately raised, will take a second growth, the first-formed tubers producing others, neither of which will answer the purpose of the grower.

Although the drought has been generally prevalent, thunder-storms, a usual consequence, have happened in some places, and which have been partially beneficial. The dry season will probably be broken up by a series of thunder-storms; and already there are some signs of this being about to take place, the air being at present loaded with heavy masses of *promising* clouds.

*August 23rd, 1835.*

PAXTON'S  
HORTICULTURAL REGISTER,  
OCTOBER, 1835.

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HORTICULTURE.

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ADDITIONAL REMARKS ON COILING VINES.

*Welbeck Gardens, Ollerton, 8th Sept., 1835.*

SIR,—By referring to the 490th page of this month's number of the Gardener's Magazine, you will there read FACTS respecting the *early* fruitfulness of grapes in pots upon the coiling system, and I much question whether the same success has ever been produced in any part of the world by any other method ; or, if ever the coiling system has been practised, whether the same successful results have followed its adoption. The practice of *layering* the vines, as at Thumrey, in France, is to produce early vigour, and is a most excellent old practice in this country, and is followed by many of my horticultural friends upon first planting. By tonguing four or five of the joints onwards from the root, as a carnation layer is tongued, to induce a greater increase of vigorous roots, and consequently a proportional vigour to the top, is attended with advantage in giving a greater degree of vigour to the plants for the first year or two, but I have reason to question its beneficial influence after that period ; its object has only been to induce early and abundant *fruitfulness* : mine has the same object in view, and a year or two is gained by the process. It is notorious that grapes have been produced by accident from a vine-cutting the *first* season as well as from one the *second*, but these instances have been the effects of accident, as far as my range of inquiry has gone ; but not so if judiciously conducted upon the coiling system ; and although there may be a nicety for the uninitiated in the *POT culture* of grapes to produce fruit

*successfully* the *first* season, there certainly can be none the *second*, if treated by the rules which I have laid down both in the Magazine and Register. I have a cutting from a young *green* shoot of this season (a Muscat of Alexandria), detached from the vine on the 11th March, and coiled into a small pot ; it girths one inch, and is only about nine feet long, and the eyes are as fine and prominent as you need desire. I have also many vines from coilers of this season, which girth from one inch to one inch and a quarter, and none above ten feet long ; some of them only eight feet, with fine bold fruit-buds.

If horticultural societies will encourage the pot culture and coiling system of grape vines by holding out liberal prizes for their exhibition, you will soon find plenty successfully cultivated in the various exhibition rooms ; and, till this is done, its merits will not be known or duly appreciated.

Excuse these short remarks, as I really have little time to devote to writing.

Your obedient, &c.,

JOHN MEARNS.

#### ON THE FORMATION OF BORDERS FOR WALL FRUIT.

THE cultivation of exotic fruit is a very material part of the British gardener's business. The glazed and fire-heated buildings erected for this purpose are of various descriptions, and suited to the different kinds of plants intended to be cultivated therein. We have also flued walls heated by fire, and, lastly, solid walls which reflect and retain the heat of the sun, and on which tender fruit trees being trained are protected while their shoots and fruit are matured.

Much of the success of these expedients depends on the aspect, situation, material, and manner in which these walls are built, but much more on the soil and constitution of the border in which the trees are destined to grow. In forming a new garden, the situation is much oftener chosen for its convenient proximity to the house than with reference to either soil or aspect : if the soil be naturally good and deep, little more is required than common trenching, and laying the general surface into the requisite form ; but, if the site consist of a poor or thin soil, then extraordinary means are taken to make the ground, particularly the fruit borders, fit for the reception and well-being of the trees.

In the execution of this necessary work, the manager very often errs in making the border both too rich and too deep. It is so natural for a



cultivator to do everything by which he thinks to encourage or expedite the growth of his trees, that he spares no pains or expense to perform his work effectually, and to over-do rather than under-do any part of his projected plan. If the ground be naturally wet, he will probably drain it; if the subsoil be clay, he will dig it out to gain his required depth; if gravel or bog-earth, he will do the same, in order that the roots of his trees may have full scope, and be at the same time fully fed.

The border thus prepared, choice trees are planted; they take to their new place, and grow away finely. In the course of three or four years the trees have covered a large space of wall; and though they have not yielded heavy crops of fruit, owing to the growth being so luxuriant, yet the trees are promising as they continue in such vigorous health.

The roots being placed in such favouring circumstances, throw up a superabundant supply of nourishment, which consequently excites every bud to exuberant action. This causes again much stopping and pruning; and the head, instead of its natural round form, with branches extended and annually extending on every side, is a mere section trained on a plane, without branches either behind or in front. The roots and head are therefore unequally balanced, for while the former are rioting in their deep and rich station, the latter has not capacity enough to digest and elaborate the surcharge impelled into it.

Trees so planted and managed possess a great deal of vegetable vigour; their shoots and foliage are ample, and the fruit which they do bear are also of large size though few in number. It may be easily conceived, therefore, that such trees are improperly treated; they are treated as if they were intended to produce timber, or merely as a cover for the wall, rather than for the purpose of yielding fruit. A rich feast of fresh maiden loam and decomposed dung is prepared for the roots, while the head is mutilated into an unnatural form and confined to a limited space; the latter is ever striving to overtop the wall, and the knife is constantly employed to keep the rambling and irregular growth within bounds. Hence there is an unnecessary conflict ever going on between the energies of the roots and restraints of the knife, productive of neither fruitfulness, nor of that moderate state or habit in which all artificially trained fruit trees should be kept.

Under such procedure on the part of the manager, he appears to have forgotten that his trees cannot be otherwise than beings purely artificial; instead of the open expanse of the atmosphere, they are to be treated with only *a half* of this; and instead of being allowed to assume their natural round-headed form, as already alluded to, they

are destined to be only thinly spread out on, in most cases, a very limited space. Every circumstance, therefore, which affects or may affect them in this unnatural situation, must be applied in such measure as shall correspond and be equal in their effects to each other. Whatever the height or space of wall appropriated to the tree may be, every thing else should be apportioned thereto; instead of a wide border for a low or limited space, a narrow one may suffice; and instead of a deep, a shallow trenched or made border will certainly be far more suitable. Such equalisation of the means of culture induces a corresponding development of the principal members of the tree; the root has no extra stimulus to excite, or superabundant sap to throw into the branches, nor are the latter prompted into that irregular state of barren luxuriance which is consequent on planting in over-rich and deep borders.

By such measures a moderate degree of growth is produced inductive of healthy expansion, and at the same time prolificacy; and by skilful stopping and selection of the required bearing-wood in the month of May, no useless growth is allowed, and little knife-work is required in winter.

A fruit border which will combine all the advantages above alluded to (to provide against the errors sometimes committed in forming new gardens), should be dry, have a solid bottom of stone, compact gravel, or pavement; the bed for the roots to spread in need not be deeper than about fourteen inches at most, and no better soil can be used, when the natural soil is unsuitable, than pure fresh loam got from a common or old pasture, and without any mixture of frank dung whatever. If the loam be considered too heavy for stone-fruit, it may be lightened with leaf-mould and *white* or road sand, if it can be procured. Sand of a deep yellow or rusty colour is bad, and should never be used for such purposes.

Excavating the natural soil to form a deep border is always a hazardous expedient, if great care be not taken to drain the hollow so made; and, if the natural soil be clay, far better it is to form the border on its surface than dig into it to gain greater depth, for this would certainly act as a cess-pool in wet weather, to the great injury of roots. When a border is so raised on clay, the surface of the latter should be first sloped outwards to prevent water stagnating at the base of the wall.

It may not be altogether presumption to assert that many fruit trees in gardens, both on walls and trained as espaliers, are barren entirely in consequence of too deep planting in too richly manured soil. An abundant growth of summer shoots are annually produced only to be

cut away twice or thrice in the course of the year, thus keeping the roots constantly increasing in extent, and, what is worse, increasing *in power*, only to perpetuate useless and barren growth, fruit being rarely produced, except occasionally at the points of the branches.

A skilful pruner and trainer, it is true, may so far correct luxuriance under such circumstances, that, by allowing no summer shoots to be produced except the leaders, and in other places where new shoots may be wanted, the roots would be also checked, and then they would do no more than is required of them ; but this is a manipulation which, if known to be necessary, is too little practised.

To have trees of moderate growth, and at the same time prolific, it is undoubtedly better management to confine the roots in a congenial bed, than by encouraging unnecessary expansion cause an overgrowth of the head, and which must be checked by some unnatural process, such as "ringing," taking up and replanting, cutting off the strongest roots, &c., &c. Such expedients are had recourse to, to check luxuriance of trees, and often with good effect ; but surely any step that can be previously taken in the management of the tree to render such violent measures unnecessary, is better far than having to check the tree in the middle of its growth.

In forming fruit borders, therefore, great depth and rich manuring should be avoided, and a dry and hard bottom, if possible, obtained. The bounds horizontally need not be defined, because the further the horizontal range the better, provided that the roots are kept near enough the surface ; air and heat of the sun are both necessary, and seem grateful to roots, provided they are at the same time in darkness. In dry weather roots will descend in quest of moisture further than is beneficial to the trees at other seasons, but they may be kept up by mulching.

The grape vine requires but a thin layer of good soil to root in, but should have as wide a range as possible ; they feed near the surface, and are much benefited by mulching with old hotbed dung at all seasons.

Peaches and nectarines require a somewhat deeper soil than the vine, but it would be well if their roots could be kept within a foot of the surface ; a similar depth is sufficient for the apple. Pears, plums, and cherries require a somewhat deeper staple, but none even of these should be invited to root deeply.

It may be objected, perhaps, that planting fruit trees in so thin a stratum of soil, the latter would soon be exhausted of its nutritive qualities, and after a few years would become unfit for the support of the trees. Such fears are reasonable, but fruit borders should be treated

like other cropped soils ; occasional supplies of manure laid on the surface over the roots during winter, and slightly forked in during the spring every second or third year, would always keep the border in good heart. Liquid manure applied during summer is also of great service to bearing fruit-trees, and an excellent means of enriching an exhausted soil.

As garden walls are usually covered with trees on both sides, it has been deemed advisable to have walls raised on arches, and thus to allow a more extensive range for the roots. But it appears that as wall trees are only exposed to half the atmosphere, a single border on one side is amply sufficient for the spread of the roots ; and besides, as wall trees are often unfruitful from their too vigorous growth, this luxuriance would be still more advanced by allowing the roots to run behind as well as in front of the wall.

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#### ON GROWING FRUIT-TREES IN POTS.

GROWING fruit-trees in pots, or boxes, is often had recourse to in small forcing-houses, and with various success. Oranges and figs do extremely well ; and it has long been a practice to grow them in this way. The grape-vine, peaches, nectarines, and cherries, are often tried ; and the custom in this country is rather gaining ground than falling into disuse.

The principal advantage of the practice consists in the trees being portable, and at the same time, being on a small scale, are conveniently placed in any spare corner of a pit or other forcing-house ; and when they have yielded fruit, are removable out of the way of others to succeed.

In France and many other parts of the continent, orange trees are necessarily kept in boxes ; for though the climate is most congenial to the trees in summer, they must be housed in winter, and in buildings more like barns than hothouses. The like treatment is received by orange-trees in this country, where they are chiefly kept for ornament, being but rarely cultivated for their fruit.

Figs, as stated above, do excellently in pots ; and where there are suitable forcing-houses for their reception, ripe fruit may be had for the table in every month of the year.

When it is considered that trees so cultivated have necessarily a very limited space for their roots, it will readily occur to every one, that

what soil they do have should be of the best quality ; and, moreover, that it must be kept so by repeated refreshments of rich top-dressings, or with manured water. It is also necessary that the trees be dwarfed by art as much as possible. A tree may be dwarfed by merely confining its roots, or denying it a sufficiency of water. But there are other means of dwarfing a tree, which should be adopted, particularly in the management of peach, nectarine, and cherry trees intended to be forced.

Besides the chief purpose of grafting and budding fruit-trees, which is the reproduction or increase of the kind, the operation is well known to have another effect, namely, correcting the natural luxuriance of the tree. A seedling grows with greater vigour, and ultimately arrives at greater magnitude, than a worked tree of the same kind. This is much more visible in some genera than in others. The wild seedling cherry, and its varieties, which are but slightly removed from the original, are immense trees, and greatly exceed, in size of bole and length of branches, the superior domestic varieties, which are preserved and increased by the art of budding and grafting ; so is the wild pear-tree, generally, larger than the cultivated varieties. This, however, does not hold in respect of the common apple, many of the cultivated varieties of which are more robust trees than the original crab of the woods and hedges, whence all the former have directly or indirectly sprung. Still, in this instance, we may infer that, if the wild sort received the same culture and care which is bestowed on the domesticated kinds, it would be equally luxuriant, and certainly much more durable, than any of its accidental descendants which have been worked.

The same effects happen to all forest-trees and shrubs which are propagated by grafting or budding. These operations appear to have a stinting effect on the inserted kind, disposing it to more moderate growth, and consequently earlier fruitfulness ; and this, again, assists to check luxuriant growth, and causes a still more dwarfish habit.

If, then, a single operation has the effect as above stated, repeating it on the same individual must have a double efficacy. It follows, therefore, that double-worked trees would be more suitable for cultivation in pots, than such as are only once worked.

Double-worked trees are seldom to be met with in public nurseries, because they are not ordinarily called for ; but any nurseryman would provide them on receiving a special order, he charging, of course, a double price. Double grafting or budding is often practised in private gardens, and with the very best effects. We have ourselves done a great deal in this way, at various places. Old espalier, or wall-trees,

which, from encroaching on each other, had become barren and un-sightly, were cut back and regrafted ; and naked branches of otherwise thriving trees, were replenished with new and active shoots, which, in the second or third year, were studded with flower-buds, and this either by budding in summer, or grafting in spring. Naked blanks in peach, nectarine, and plum trees, are often effectually filled up by the insertion of a bud, provided it be not too near the root, where the bark is too much indurated to permit the operation. It is scarcely necessary to allude to the manner of renovating old trees in the cider and perry counties, by regrafting the largest branches—an operation usually performed by the common carpenter, with his saw and a small knife. We give these instances to show, not only the practicability of double working, but of its great utility in checking luxuriance, and promoting fruitfulness.

Vines, figs, cherries, peaches, and nectarines, are the kinds usually considered worth the trouble and expense of potting for forcing. Of these in their order.

The vine, whether propagated from an eye, a cutting, a layer, or a coil, should be established in its pot twelve months, at least, before it is forced. The pot should be well drained by laying pieces of broken crockery over the hole or holes in the bottom, and these enlarged, if thought necessary. The size of the pot should be in proportion to that of the root it is to contain ; and it is better that it should be necessary to shift the plant into a larger, in a year or two, than place it in too large a one at first.

The best compost with which to pot vines, as, indeed, all other fruit-trees in pots, is a mixture of fresh, mellow loam, and well-decomposed stable-dung—two-thirds of the former to one-third of the latter, and prepared a month or two before it is wanted.

A potted vine generally requires a stake ; and the manner of pruning at the time of potting (which should be early in the autumn) depends on the station they are intended to occupy when put into heat. If intended to be forced in a hotbed frame, a low pit, or on the front flue or platform of any hothouse, then the vines should be cut down, and trained like low bushes. But if intended to stand on the back flue or shelf, or on the front or back curb of a pine-stove, with the bearing-wood trained to a trellis under the roof, then, in that case, the principal stem should be cut longer or shorter accordingly. We have many times seen abundant crops of fine grapes on potted vines treated in this way ; that is, the pots placed on the curbs, or other supports, and the fruit-bearing wood tied to the wire or wood trellis of the roof ; or if it happens that a potted vine has, either by accident or design, a

fine, long, fully-ripened shoot, it may be successfully forced by placing the pot at the front of any house or pit, and fixing the shoot up under the glass. Nay, more—we are quite certain that such potted vines, if so placed in a vacant melon-frame, on a south border, in the spring of the year, and without other heat than that of the sun, reflected from a compact layer of white sand in the bottom of the frame, and the protection of mats during the cold nights of April and May, would ripen their fruit perfectly about the beginning of September, or, perhaps, sooner.

The long shoots of potted vines, to suit particular stations, may be trained spirally, round four or five sticks set near the stem in the pot, and, leaning outwards, would be a convenient position for both the lengthening shoots and pendent bunches of the vine.

No successful result can be expected from potted vines, unless the bearing-wood, or rather the wood whence the bearing shoots are produced, is strong, and perfectly ripened in the previous summer. For this purpose, the young and untried trees should either be kept in a warm, airy hothouse, or half-plunged against a south wall, that the young wood may have the advantage of the reflected heat of the sun. In such situations, however, those intended to be trained and kept in the bush form, should not be allowed to waste their strength in the production of long shoots, which will only have to be cut away. Stopping their points from time to time will enlarge the lower parts, and arrest the vigour where it will be most wanted in forcing time; taking care, however, not to stop so near home as to risk the bursting of the buds at the base of the shoot.

When vines in pots have ripened their fruit, they are often taken out of the house too soon, and put away in some by-corner, and neglected. This is wrong; they should be mulched, and placed in full air on a warm border, that their wood, both old and young, may be thoroughly matured. Liquid manure should be given now and then; but the roots should be kept, at this time, rather dry than otherwise.

Vines well established in pots should always have a part of the soil removed from the surface, without injuring the roots, and have some fresh compost added, and this covered with half-decayed stable or cow-house dung. Such established plants may be put into heat at any time; but from the middle of January, to the end of March, is the most favourable to commence forcing potted trees.

In every garden where there is a hothouse or forcing-pit, it is good management to keep a dozen, or so, of the different varieties of figs in pots; they bear fruit when very young, and require much less pot-room and space than other fruit-trees; they also succeed with much

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circumstance which may have assisted to clear the best land first, where there was any diversity. Buildings were absolutely necessary for an increasing population ; and the finest timber for the builder, growing on the best land, was the first felled, and so left it partially cleared for the purposes of depasturing, and ultimately for the plough.

Whether judgment or any accidental circumstances caused the best land to be first cultivated, is a matter of no moment ; but that it was so, is, as already stated, very evident, as well as a very natural proceeding. Now this description of land being of a loamy character, and liable to become *clung*, as farmers call it, that is, so saturated with rain during winter, it was found most unmanageable when it came to be sown in the spring ; but the cultivator discovered that, if it were ploughed in the autumn, and exposed to the action of frost in winter, it became so mellowed, that it was in the finest order for sowing in the spring. Nor was this all ; the philosophers of those days conceived that there were certain nitrous qualities which floated, in frosty air particularly, and which were inducted by the rough or ridged surface in much greater measure than if the ground had lain flat or undisturbed. Thus the cultivator's and the philosopher's notions were firmly united, and henceforth constituted a standing rule of practice, that all land under the plough or spade is *enriched by exposure to the atmosphere*. Hence the custom of ridging the soil in gardens, as well as in fields, became general ; and not only on heavy, but on the lightest sands and gravels.

That there are many districts of heavy land in this and other countries, which, without autumn fallowing, as it is called, would be unmanageable in the spring, is perfectly true, not that it is enriched by the reception of nitrous or other qualities, but merely by its adhesive property being destroyed by the frost and drying effects of the air, and thereby rendered loose, and fit for the reception of either seeds or plants. Ridging or rough-digging such land is indispensable, and of the greatest utility in its culture, and benefit to the crop raised upon it : but here the advantages of ridging, whether in the fields or in the garden, ends. Light, sandy, or gravelly soils need no such preparation ; for neither is this ever so bound together as to require disruption by frost, or so drenched with moisture as to require bleaching for several months in the sun and air. On the contrary, the more compactly light land is laid, or suffered to lie, before it is worked for sowing or planting, the better the crop will succeed upon it. Exposing such soils to the sun and air, not only robs it of moisture, but at the same time of a great portion of its humid riches. The richest stable-yard manure, if spread out and long exposed to the sun and air, is surely

of less value as food for plants, than if applied in a moist state. So it is in respect of light land long exposed in ridges ; it needs no pulverisation or reduction of its constituent parts ; and, therefore, laying it in ridges can only detract from its value, and defeat the object of the cultivator's labour.

Z.

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## LANDSCAPE GARDENING.

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### LETTER IV.

I CLOSED my last letter with a promise to give you a more particular account of that portion of the grounds which immediately surrounds the mansion-house, offices, and gardens. You are already aware that it is that portion of the park which, being fenced from cattle, has received the greatest share of taste in the general disposition of its various features, and constantly receives the greatest attention to keep it what it really is—a most interesting spot, combining all the pleasing advantages of an arboretum, shrubbery, and flower-garden within its bounds.

Every tree, native or exotic, that was known four-score years ago to be sufficiently hardy to bear the British climate, and whether useful or ornamental, has here a place, some of which are of large dimensions ; and all the later-introduced exotic trees and shrubs are added as soon as they are purchaseable.

In describing this portion of the gardens, it will be as well to begin at the house, and make a tour over the whole. I have first to observe, that the ha ! ha ! opposite the front and sides of the house, is considerably higher than it is in any other part, except at the entrance into the back court. It is at an equal distance from the three fronts of the house, and on the outside face has some little architectural character bestowed upon it. Pilasters, at regular distances, support a projecting cornice, surmounted by a low parapet and coping. At the salient angles there are outward breaks on each side, which add to the strength and massiveness of the whole, when viewed from the park ; and as its pilasters, &c., correspond in some degree with the architecture of the house, the whole not only gives elevation, but appears to be the actual base of the building.

On these three sides, the ha ! ha ! is about forty-five yards from the walls of the house, and inclosing an open platform diversified by smooth

walks, fine turf, a few elegant shrubs and trees, and numerous plots of flowers. These, however, are all so disposed as not to mask the windows, or obstruct the views down into and across the valley, to the opposite and distant scenery of the park and surrounding country.

The platform is divided by a straight walk, proceeding from the south door of the house to a flight of steps at the other end, which lead down to the ha! ha! and fenced by an iron gate. This is only an occasional outlet for company wishing a stroll in the park, or for the admission of equestrians wishing to alight there. In the centre of this walk, and half way betwixt the house and steps just mentioned, there is a sun-dial, supported by a kneeling white-marble figure of *Time*, most elaborately and correctly executed.

There are but few trees admitted on the platform, for reasons already given. An acacia (*Robinia pseudacacia*) t one angle of the house, and a deciduous cypress (*Taxodium distichum*) at the other, with two or three others of equally light and elegant forms, are planted at the sides. These, as well as some low evergreen shrubs, are placed so as to flank some of the most extensive vistas across the park, and always thrown against or backed by groups of trees planted on the slope, outside of the ha! ha!

The advantages, convenience, and beauty of this disposition of what I shall henceforth call the *terrace*, are manifold. The cheerful airiness and light afforded to every front window and room in the house; the highly-dressed surface without, corresponding to the elegant comfort within; the pleasing ideas of security arising from the impassable fence by which it is inclosed, together with the freedom it allows of looking on the face of the sky, as well as on the face of the earth, are all circumstances of the most gratifying kind, and, moreover, are indispensable to a country seat.

A walk on a raised terrace, with its embattled parapet, is not only one of the most inviting and agreeable, but one of the oldest features belonging to the ancient country seats of our sovereigns, nobles, and knights of former days. In the feudal times, when every baron's house was a castle, the terraced front was indispensable; it was the only place the inmates had for recreation and exercise in safety and seclusion. Thence they could observe the movements of an enemy, or descry the approach of friends. Here the plumed knight

Strode stoutly east and west the wa' ;

and here the lordly dames flaunted in all their lofty dignity. Whether for the moated mansion in the valley, or for that on the precipitous

brow of the hill, a terrace was absolutely necessary, as well for safety as for the eye of vigilance.

Happily the necessity for embattled terraces no longer exists ; but, considering them as most convenient appendages to a house in the middle of a park, it is to be regretted, perhaps, that, in the modern or Brownian style of landscape gardening, the terrace was an object of aversion, and consequently was doomed to destruction. The space it occupied is now " bald and bare ;" and the house which such a feature dignified is now set out on the naked lawn, as if it " had dropped from the clouds." The few trees which are allowed to remain in its vicinity, seem afraid lest they should either shade or shelter it ; and thus insulated, the mansion stands exposed, an eye-trap to all the country round. Instead of appearing embosomed in its gardens, and flanked by evergreen shrubs and trees to unite the building with the park and surrounding country, it is stripped of all those appendages which give ideas of unity and ornamental comfort to a country residence. The same modern style of improvement removed the stables, laundry, and some other offices to a considerance distance from the house, and often made them tastelessly obtrusive ; and as they usually had an ornamented *façade* somewhat resembling the style of the mansion, the whole appeared to be a wing of the latter, separated therefrom by some convulsion of nature. The kitchen-garden, too, with its forcing-houses, &c., was deemed unfit to be near the house, and was often pushed away into some hollow, a mile or two distant.

That there are many instances of such bad taste in this country at the present day, is notorious. Brown's idea of allowing the sheep and cattle " to graze up to the windows," has been too much acted on, and, in some instances, which I have been witness to, with the most disagreeable effect. Porticoes and colonnades have become cattle-sheds, causing a world of work, and much tear and wear of mops and brooms. And even where these visitants have been kept off by a slight iron fence, the usual resource, the herds are sure to assemble on the west side of the house every morning in hot weather, where they prove an intolerable nuisance, especially if the carriage-road passes on that side.

How the father of the present proprietor remained inflexible against the fashionable taste of his day, and unmoved by the prevailing opinion that terraces were deformities, cannot be accounted for otherwise than by supposing that, like the amiable Shenstone, he thought for himself, and could not give way to new-fangled notions which had no rational basis either on the score of scenographic effect, propriety, or convenience ; and the result of his non-compliance, and refusal to " follow a multitude to do evil," is the preservation of a most beautiful trait of the place,

admired by every one who can appreciate convenience and propriety as ingredients in the composition of a country seat.

Besides the terraced walks round the exterior of the platform, and which I omitted to notice in the right place, another walk, of equal width, surrounds the house, at a distance of about five feet from the base, the intermediate space under the windows being covered with turf, broken by knots of low shrubs, and little beds of violets, and other odoriferous flowers.

The exterior and interior walks unite nearly opposite the northern angles of the house, and lead away into the pleasure-ground. The trees and shrubs of the latter extend about fifteen feet southward, along the sides of the former, thus veiling the angles of the house, and completely hiding the offices from every point of view.

At the points where the terrace-walks unite and enter the pleasure-ground, there are treillage entrances bespanning the walk, and extending ten feet on each side, covered by the finest hardy climbers; and immediately opposite the middle of this treillage and pleasure-ground walk, and about ten feet off, there are statues, large as life, on pedestals—the one on the east side being that of *Flora*, and the other, on the west side, that of *Ceres*. The pedestals of these statues, as well as that of *Time* on the south front, are paved round, and serve as stations for greenhouse plants during summer.

Proceeding from the trellised entrance on the east side, northward, we first pass through a close thicket of evergreen shrubs and trees: of the latter, a few are deciduous, but the chief are very large and lofty hollies. The first object which attracts attention is a light and elegant iron bridge, of one arch, over the carriage entrance into the back court. Both banks of this artificial ravine are thickly planted with evergreen shrubs and trees, which nearly meet over the road. The floor of the arch is nearly level, and sufficiently elevated above the road to admit the highest carriage; and its ends and abutments are sunk and concealed among the foliage. Advancing onward, we pass through another close thicket of evergreens. These thickets have a double value; they not only serve to hide the offices from distant parts of the park, but very much enhance the value and effect of the open scenes to which they lead; for, soon as the last thicket is passed, we rather suddenly enter a most interesting open space laid out as a flower-garden. The west side of this open space is thickly planted with trees and shrubs, diminishing in height from the back, against the kitchen-garden and offices, to the front. The east side, next the park, is more thinly and irregularly planted, and apparently associating with the groups on the outside of the ha! ha!

In the middle, though not exactly central (as it is rather nearer the west than the east side), stands a very handsome greenhouse. It is a parallelogram in plan; ends and sides square, and covered by a double-pitched, glazed roof, but which is hidden by the entablature of the structure. It partakes of the architectural character of the mansion-house; the uprights of the front and ends are made to resemble pilasters; and, what with a cornice and prevalence of horizontal lines, shows the connection. It is well adapted for Australian, South African, and South American plants, the collection being, however, rather select than numerous. The plants stand on a graduated stage, occupying the middle of the floor, like a depressed, elongated pyramid. Abundance of light is admitted, the whole house being glazed, except the north wall. A path surrounds the stage, formed of cast-iron grating, under which the flue is built. The ends and front are furnished with shelves for potted plants requiring to be near the glass: and now the plants are in, the whole have a gay and healthy appearance, none being allowed to grow large; and, no doubt, when the plants are out, and the upright sashes removed, the skeleton of the building will present a very ornamental object: but, of this house and its management, more hereafter.

On first entering the flower-garden the walk is divided; one branch leads to the right, which winding makes an appulse to the sunk fence, and afterward, onwards, falling into the leading walk beyond the flower-garden.

The other branch of the walk, which leads to the left, trends round to the westward of the greenhouse, and thence onward to the end of a shady walk, to be noticed presently.

In proceeding along this branch of the walk, and before arriving opposite the end of the green-house, we come to a parallelogram-shaped bed, raised about a foot from the general surface, and filled with suitable compost: this is appropriated to the finest double ranunculuses. Next, beyond, is a hyacinth bed, of greater width and length, raised two feet ten inches from the ground by boarding, and fitted up with slender columns on each side, with a roof-like frame over for an awning during the flowering season. Beyond this hyacinth bed, and directly opposite the end of the green-house, there is a circular basin, of considerable capacity, with an ornamental fountain in the centre, which is constructed to discharge water at pleasure. The basin has a curb of hewn stone, and a two-feet-wide margin of turf, surrounded by a gravel walk. Close to the side of this circular sweep of walk, and round all the west side of it, there is erected a substantial wall of trellis-work, coved over a little at top, and thickly covered with ivy. In the centre

of this ivied screen there is a seat, and on each side shelves for holding potted carnations, pinks, auriculas, or other fine plants, which only require the morning sun when in flower. These shelves, I am told, are always, more or less, furnished with flowering plants throughout the season; and, except in very severe frosts, is an excellent station for auriculas and many other potted plants.

Leaving the basin, and proceeding onwards, the next object is the tulip bed, of similar form and extent, and awninged over like that for hyacinths, only it is not raised so high from the ground, because the excellence of a tulip can only be seen by looking down into the flower. Beyond this bed there is another for anemones, of the same form and dimensions as that for ranunculuses, already noticed. All these beds are filled with annual flowers raised for the purpose, or with super-numerary green-house plants, soon as the bulbs and tubers are taken up, and remain till it is time to replant the bulbs, &c.

That you may have a clear idea of this flower-garden, I shall add a few words of general description. I have already stated that it occupies an open space, bounded by thick plantations on the kitchen-garden side, and by a less dense fringe towards the park. It is of an oval form, the greenhouse being, as before observed, central. This is somewhat elevated, and the general surface of turf lies in a kind of semicircular hollow round the east end of the building, at the distance of about fifty yards. The surface is skilfully varied by groups of small trees, shrubs, and knots of flowers, the largest and highest of each being most distant from the east end of the greenhouse, which may be considered the central point of view, and with reference to which the principal masses have been disposed; and sure I am that, from this point (where there is a seat, and which is shady in the afternoon,) a view of the whole must be a *coup d'œil* of the most delightful description. The various tints and colours of the flowers and foliage, the different gradations of their respective heights, and the beautiful play of the verdant turf winding among and dividing the groups of plants from each other, are altogether a most lovely spectacle. The plots of shrubs and flowers are of very many forms, but neither exactly regular nor fantastically irregular. Narrow, irregular glades are preserved, to give apparent scope; but no very formal lines (except those of the beds and building) obtrude themselves, to give an idea of stiffness or unnatural controul.

The Italian and other ancient modes of laying out and disposing flower-gardens, called "topiary work," formed of hedges to conceal the extent, and devious paths to distract and mislead the visiter—or, if without hedges, the surface cut into numberless whimsical geometrical



figures—were abolished soon after the beginning of the last century. So much art was exercised in their first formation and subsequent keeping, and so different from every pleasurable disposition of nature, that they were condemned as violations of all true taste. These were succeeded by designs of far more chaste and less intricate character—simple dispositions, which included beauty in the strictest sense of the word; dispositions without studied intricacy, and entirely free from roughness, angular terminations, or abrupt turnings. Aiming only at simplicity and general smoothness, the closest turf was chosen as the general carpet, embossed with the gayest shrubs, and enamelled with the sweetest flowering herbs, and shaded thinly with trees of the most light and feathery foliage. Through among these groups gravel walks were led in graceful, though not in regular curves, so that the whole might be seen without leaving the walks, unless in dry weather the turf might be more more inviting to the lover of flowers.

It is in this style the flower-garden at Fairfax Hall has been designed; and, considering it as a station for the sole culture of flowering plants, it is excellently adapted. In size, it is large enough to contain every choice plant, whether herb, shrub, or tree, and whether annual, biennial, or perennial; and being at all times kept in the highest style of neatness, must be at all seasons a most charming spot.

Geometric flower-gardens exist but in very few places in this country at present; but I observe, from what has been lately published in horticultural periodicals, that there appears to be something like a return to that style of gardening. This retrograde movement is justified on the ground that we, in escaping from the stiff and formal style prevalent during the reign of William III., have run into the opposite extreme, by a futile endeavour to give the acknowledged works of art a natural semblance. Works of art, it is said, should be acknowledged as such by every practicable means. Trees, shrubs, and herbs should be kept in masses by themselves, to show that not any one of them has been so placed by chance; and, moreover, that all planted trees should be chiefly exotics, to show still more clearly that the scenery is entirely artificial. Now, in considering this train of argument, it does strike me that, on entering a park or garden, we need neither exotic trees nor regularity of arrangement to remind us that we are not in a forest, or on a common. Nor can I conceive a situation in which any person could be placed, as to leave him in any kind of doubt whether or not he was in a garden; for whatever its plants or style of arrangement may be, it needs not a descriptive sign, like the bad picture of an ancient painter, who was obliged to write "*This is a cock*" below his

bad figure. No; its very fences, paths, or walks—its *tout ensemble*—tells the visitor at once where he is: and as to the disposition of the plants, this depends entirely on the *predominating principle* of propriety and fitness, as well for the sake of the plants themselves as for their associated appearance to the eye of a spectator.

In the disposition of trees, &c., it has been advised to borrow the conceptions of the most eminent landscape painters, in order that the combinations in the garden may accord with the ideas of the painter, as to what are the most pleasing associations of visible objects to the human eye, and independent entirely of either their kinds or qualities. So, therefore, the excellence of plan, and manner of disposing the choice plants of a flower-garden, does not depend on the character of its lines and form of its masses merely, but in the harmony and pleasurable effect arising from it as a whole; and this effect, I think, is decidedly accomplished in the beautiful spot I have been attempting to describe.

I have noticed the greenhouse and the several beds which properly belong to the flower-garden, each of which require some further notice to embrace information concerning them, which I have at various times learned from the mouth of an old and very civil gardener; but this I must reserve for my next, remaining, in the mean time,

Yours truly,

A. B.

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## FLORICULTURE.

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### ON THE CULTIVATION OF THE CARNATION,

IN REPLY TO DELTA.

I AM well aware, with your correspondent, “Δ,” that carnations are grown remarkably well in the neighbourhood of London; but he must allow me to say, they are equally well grown in other districts, in quite a different compost. Will your correspondent allow me to ask him whether he ever saw carnations grown on my plan? if not, he certainly is not able to give an opinion upon it. I beg it may be understood—I do not say his system will not answer for many sorts, and well too, though, I believe, for others it would not, so well as with a

mixture of sand and leaf soil. I send inclosed a painting of the unique carnation which I promised some time since. I beg leave to say, I believe every petal is correctly copied, good and bad. This beautiful flower was grown in the open ground; and, giving the Londoners every credit they deserve, I think they cannot produce a finer specimen. I believe, were your correspondent to grow this plant in loam and dung only, he could not produce a bloom worth having. The principal objections brought by "Δ" against growing carnations in the open ground are, the wire-worm and inconvenience of shading, &c. With regard to the first, I shall be glad, in a future number, to give some directions for preventing the depredations of this intruder, which I think are not generally known; and as to the second, they are as easily protected in the open bed from the winds, as when in pots. I made no objection to planting them in pots, on the score of watering them; my reference was to a different thing, as all must be aware it is as easy to give water in pots as in beds. Has your correspondent seen the carnations grown in Nottinghamshire and Lancashire, by many of the mechanics, in the open ground? If not, I must say he appears, to use a common phrase, very "hard of belief." He also seems very positive with respect to layering in May. I have this year about two hundred layers in May, not one of which is what he terms "long-legged;" though, I believe, if grown in strong loam and dung only, many of the stronger-growing sorts would be so.

I beg, in conclusion, to say, the carnation is naturally a very hardy plant; but, from the treatment many have given it, it is not near so much so as it was. I cannot see any reasonable ground your correspondent has against placing them under a shed in winter; they might there have plenty of air, and be protected from a superabundance of moisture, snow, and hail. Four strong stakes driven into the ground, and covered with thatch or matting, would make an excellent shed, at little or no expense; though one constructed against a wall, in a similar way, is what I should prefer.

G. T. DALE.

*Wirksworth, September 2nd, 1835.*

## NOTICES OF BOTANICAL PUBLICATIONS.

EDWARDS'S BOTANICAL REGISTER, continued by Dr. Lindley. September 1st, 1835.

1. *Gesnera faucialis*. Wide-mouthed Gesnera. This herbaceous plant is considered the finest of the whole genus; it is hardy, and thrives in the green-house, if not kept too damp.

2. *Erythronium grandiflorum*. Large American Dog's-tooth Violet. A hexandrious plant, discovered by the late Mr. Douglas, and received by the Horticultural Society several years ago, but only flowered, for the first time, in May last. It is as yet a very scarce plant, it producing neither seeds nor offsets since it has been in the Chiswick garden.

3. *Oncidium pulchellum*. Pretty Oncidium. A very beautiful-flowering species, belonging to the natural order *Orchideæ*. The flowers are produced on a long panicle, and in colour white, tinged with yellow and purple. It requires similar treatment as the others of the order to which it belongs.

4. *Azara dentata*. Toothed Azara. A common shrub in Chili. It is a half-hardy plant, and succeeds in this country if planted against and trained to a south wall.

5. *Oncidium Lemonianum*. Sir Charles Lemon's Oncidium. This plant, imported by a Captain Sutton, was presented to the gentleman with whom it flowered, and who has afforded for it a specific name, is a little delicate species, and found growing on the stems of trees. It is said to have, like many others of this order of plants, *pseudo-bulbs*, that is, bastard bulbs, or gouty stems, proceeding from the root, and bearing each one leaf. The term *bulb* must be considered, in these instances, as merely a conventional term, because the member in question has no relation to a true bulb, neither in structure nor as containing the fructification in its bosom.

6. *Kennedyia Marryattæ*. Mrs. Marryat's Kennedyia. A fine climber, from Swan River, Australia, bearing showy scarlet flowers, and promises to be one of our most ornamental green-house climbers. It belongs to the natural order *Leguminosæ*.

7. *Arctostaphylos tomentosa*. Downy Bear-berry. A shrub, from the west side of North America, expected to be hardy enough to bear the open air in this country. It bears racemes of white flowers resembling those of *Itea Virginica*, or like some of the heaths, to which latter it is allied. —

After describing this plant, Dr. Lindley alludes, with very com-

mendable feeling, to the circumstance that, notwithstanding our national and individual ardour in the cause of botany, and the vast sums annually expended in search of plants, there are still, and almost within our reach, numbers of magnificent plants which are only known to European botanists by dried specimens. Of these strangers in our collections, Dr. L. mentions three genera which are well known to exist in Peru, and of which we have as yet had no living plants, viz. *Befaria*, *Thibaudia*, *Gaylussaccia*. Dr. L. has lately seen a collection of specimens from that quarter, with which he appears to have been quite charmed, and which has induced him to urge in the warmest manner a botanical expedition to that land of vegetable beauties; pressing on the attention of amateur noblemen and spirited commercialists to send collectors to the country which promises so abundant a harvest to the adventurer. Among the specimens, Dr. Lindley has found one allied to *Thibaudia*, which constitutes a new genus, and which he has described and named *Cavendishia nobilis*, in honour of the present Duke of Devonshire, whose liberal support of the cause of botany is so well known.

8. *Calotropis procera*. Tall Calotropis. This appears to be the old *Asclepias gigantea*, one of the most common plants in our stove collections nearly fifty years ago. It is most abundant in sandy soils, on the skirts of jungles, on the Coromandel coast. The road from Madras to Velloor is fringed with it nearly the whole way.

SWEET'S BRITISH FLOWER GARDEN, continued by D. Don, Esq., for September 1st, 1835.

1. *Pavia carnea*. Flesh-coloured American Horse-Chestnut. This is a highly ornamental low-growing tree, and, when in flower, in the end of May or beginning of June, is one of the most conspicuous in our collections. The *Pavias* are separated from the *Æsculus* in consequence, we believe, of bearing smooth, instead of spinous fruit, like the latter. The high-coloured *Pavia* has not been many years in this country, which is the more remarkable as there is a fine avenue of them at Geneva, which must have long ago attracted the notice of British travellers who happened to be at that celebrated place in the flowering season.

2. *Orobis hirsutus*. Hairy Bitter-Vetch. This is a desirable hardy flower-border plant; it is a native of the south of Europe, but not frequent in this country, except in botanical collections.

3. *Linum flavum*. Yellow Flax. This is a very showy plant, and on this account has been kept in the greenhouse; but it is recommended as sufficiently hardy to take a place in the flower-border.

4. *Symphytum officinale*; var. *Bohemicum*. Bohemian Comfrey. The conglomerated flowers of the comfrees are all more or less striking; but this, from the very vivid crimson of its flowers and dwarfish habit, is well worthy a place in every flower-garden.

PAXTON'S MAGAZINE OF BOTANY, September, 1835.

1. *Clianthus puniceus*. The Glory Pea. A lately-introduced plant from New Zealand, noticed by us in a former number of the Register.

2. *Chorizema Henchmanii*. Henchman's Chorizema. A beautiful greenhouse plant, introduced by the collector whose name it bears. It should be in every collection.

3. *Dendrobium fimbriatum*. Fringed Dendrobium. An orchideous plant, partaking of the general curious structure of the order. The specific name is particularly significant.

4. *Petunia nyctaginiiflora violacea*. A new variety, raised at Chatsworth, remarkable for its peculiar colour and splendid appearance as a flower-border plant.

In this number, remarks on the treatment of orchideous plants are continued, with additional lists of their names and different modes of culture.

FLORISTS' MAGAZINE. By F. W. Smith.

Mr. Smith's able pencil is giving increasing value to this beautiful work. The specimens of florists' flowers herein portrayed, are well chosen, and accurately drawn and coloured. The September number contains—"Lady Peel" and "Nabob" pansies; "Princess Victoria" and "Sir Walter Scott" pinks; a fine double-striped variety of *Camellia*, called "*C. Donklaaria*;" and the "Lavinia" dahlia—a most elegant white and pink variety. Amateur and commercial florists cannot have a finer field for exhibiting faithful figures of their unique flowers than this work; and as it is extensively circulated, it is an excellent channel for conveying intelligence of new and first-rate varieties.

## MISCELLANEOUS INTELLIGENCE.

**HORTICULTURAL SOCIETY OF LONDON.**—An extraordinary meeting was held on the 16th instant, and attended by several of the nobility and gentry, members of the society. Dr. Lindley announced the presents to the society lately received, among which were, "The Transactions of the Horticultural Society of Vienna," and "Flora Batavia," from the King of Holland. Among the flowers exhibited were many fine dahlias, a *Gladiolus præceps*, a double yellow *Datura*, a *Pardanthus clementis*, *Menatea cordifolia*, *Bignonia grandiflora*, &c. Of fruit there was the Cannon-Hall Muscat grape, Duchess of Oldenburgh and Kerry pippins, and the Manx and Dutch codlins; also a Rosanna peach, which ripens readily on standards. Plants from the gardens were, the *Escallonia Montevidensis*, *Linaria Dalmatica*, *Amaryllis belladonna*, and *Mimulus cardinalis*; the last-named a new and splendid species.

**BRITISH ASSOCIATION.**—At the meeting recently held in the city of Dublin many scientific lectures were given, and much interesting matter relating to both art and science was promulgated. Among other matters, "Mr. Babbage stated that he had been led by an accidental circumstance to the contemplation of a subject of so simple and definite a nature, that it could be grasped by ordinary understanding, and might be made a matter of instruction and profitable research by many of the intelligent individuals then present. The absolute establishment of a new step in any branch of knowledge, he did not think of so much intrinsic value as the train of reasoning which led to it: the mind dwells upon the one as an axiom, while the contemplation of the many circumstances which were found necessary to sustain or confirm it, opened a wide field for the exercise of the mental faculties, and supplied them during the investigation with much valuable information. The possibility of ascertaining the age of certain trees by the circles or layers of the wood, had been discussed and proved before one of the sections" [of the Association] "on the previous day. This subject had reference to the one upon which he was about to treat. Sitting one evening with a friend under the shade of an old ash tree, it became the subject of conversation; and after taking into consideration some of the circumstances affecting the growth of trees, the idea forcibly struck him, that the superior width of one layer or circle of the wood, as compared with another, might, by analogy, be made the means of determin-

ing the period at which any specimen (fossil or ligneous) which might be discovered, existed. In years of luxuriant vegetation, the quantity of ligneous matter deposited will necessarily be infinitely greater than in dry or unfavourable seasons; and those annual layers or deposits are, in almost every species and variety of wood, obvious to the eye, and easy of enumeration. He submitted a diagram representing a section of wood, and showing the annual circles, of various magnitude, equivalent to the luxuriance or unproductiveness of the seasons in which they were produced: in some cases, following each other in uniformity of size and appearance for a series of years, and then presenting one or more circles of unusual size; in others, alternating in groups of good and inferior vegetation. The truth of this representation he believed would be admitted by every practical and scientific man; and by means of its application, he had no doubt, were the subject pursued in a spirit of patient and scientific inquiry, we should be enabled to connect one tree with its predecessor, from the sapling of our own planting to the oak of the forest; and from it, through many generations buried in our bogs and submarine forests, down to the lowest state of fossil organisation; and thus, by a comparison of the plentifulness of one year, or years, with the scarcity of others, establish a sequence of time extending to a period long anterior to the deluge, and leading to the most interesting and important results. To unite this series with some fixed point, was what he wished. It might be difficult to do so, but it was by no means impossible; and he called upon those around him to second him with their acquired experience and future observation. He would relate a circumstance which, in addition to the proofs advanced in the botanical section yesterday, would scarcely leave a doubt as to the accuracy with which the age of a tree may be determined by the number of its annual rings. In one of the Cape Verd islands there is an old (we believe, cork) tree. Three hundred years since, some English travellers, attracted by its apparent antiquity, carved their names on the bark, and after their return to England made a record of the transaction. Recently a party had the curiosity to ascertain if any, and what vestige of the incisions remained; and on cutting their way into the tree, found all the names in perfection, removed just three hundred rings from the bark. On making an admeasurement of the trunk, and ascertaining the number of rings in a given quantity, they calculated that the tree had existed upwards of five thousand years!"

[We apprehend that this calculation is misreported or misprinted, because this is assuming that the tree existed before the general deluge: and besides, we have our doubts whether the wood of the cork



tree be so durable as to continue sound for three hundred years. The tree may continue alive for that or a longer period; but not those layers of wood formed three hundred years ago. Many individuals of the common oak, now standing in this country, are known to have existed above three hundred years; but it is extremely questionable whether any portion of the layers of wood formed then, are now sound.]

Mr. Babbage goes on to state, that, "in order to commence the series, it might be possible to connect some of those older trees with some of those deposited in the more recent portions of the earth's strata, as the latter and the former may have existed at the same time, although in different stages of growth; and the next attempt might be made with those imbedded in our deeper bogs, and the connection pursued till all traces of vegetable existence were lost in the primitive rock."

Connected with the views of Mr. Babbage in the above extract, and alluded to by that gentleman in it, Mr. Mackay, curator of Trinity College Garden, "submitted a polished piece of Irish yew, which furnished a striking instance of the slowness of growth and great age attained by this species. The particulars were communicated by Mr. Charles W. Hamilton, Honorary Secretary of the Horticultural Society of Ireland. The number of annual layers or circles in this specimen, proved its age to have exceeded five hundred and forty-five years. Mr. Mackay adduced several arguments to prove that this tree is indigenous to Ireland, and at present consists of two species—the spreading or common yew, and the upright or Floren's-court variety. He stated also, that many fine specimens of the species might be seen at Comber, and near Antrim, and at Mr. Bourne's, of Terenure, near this city.

"A member of the section mentioned a yew tree, the property of Mr. Tennant, of Bangor, of which at present a portion only remains: forty years ago, however, it was measured by a gentleman, who counted the layers in a given quantity, and making the proper allowance for the difference in breadth between the central and more superficial circles, pronounced its age to be coeval with (if it did not exceed) the Christian æra. Several hybrid varieties of the tree were reported to the meeting by members.

"Dr. Litton, Professor of Botany, stated that the tradition of the great yew at Mucross, in Killarney, exactly corresponded with the number of years indicated by its layers.

"Mr. Mackay read a paper on the discovery of several plants indigenous to Ireland, which had not before obtained a place in the catalogue of Irish plants. This last included a number of heaths found by him-

self on Cunnemara, and by Mr. Moore in the north of Ireland ; amongst those was *Erica mendisia*, a plant with a beautiful white flower, hitherto much in request among cultivators. A number of curious varieties of the plant, known in gardens by the name of London Pride, were reported as indigenous to several parts of Ireland.

" A member stated that, in travelling from Edinburgh to Dublin, he was struck with the peculiarity of vegetation exhibited in the several districts through which he passed ; plants of various tribes, abundantly diffused in one, were gradually lost as he proceeded to the next, and other productions, unknown to the place he had left, growing in profusion and luxuriance.

" A conversation on the locality of plants took place, involving some interesting questions, by which the various physical states of the atmosphere are indicated in different portions of the empire, and the susceptibilities of certain species and families of plants which inhabit them.

" On a previous day, Mr. Niven, curator of the Glasnevin Botanic Garden, read a paper on the natural arrangement of plants, and presented some specimens of new plants found in Wales, on the western coast of England. Mr. Robert Ball reported the discovery of some new plants on the Hill of Howth. Mr. Babbington informed the meeting that he had found *Scirpus sevie* in abundance in Anglesea, near Holyhead. Dr. Graham said he found it also at Galloway, in Scotland. The Doctor also found the *Orchis pyramidalis* [*Anacamptis pyramidalis*] in the same place. Mr. Babbington said, three of the *ranunculus* tribe were commonly confounded under one—the *aquatilis*, *palustris*, and *circinatus*. Mr. Babbington also informed the meeting that Reichenbach distinguished three distinct species under the head *Orchis bifolia*, two of them natives of Great Britain ; they were chiefly distinguishable by the form of the anthers—one round, the other elongated. A communication was read from Mr. Hamilton, of Mexico, offering his services to the British Association in forwarding seeds and plants, and describing some new plants of that country, one of which was a *Solanum*.

" Mr. Nicol read a paper on the structure of the horizontal branches of the natural order *Coniferæ*. This is highly useful to those who study the fossil remains of vegetable substances. Mr. Mackay submitted several specimens of bog-timber, some Scotch fir found eighteen feet under the surface ; also some specimens, with marks of their being charred when they fell. He also detailed the uses made of bog-timbers in Ireland. Mr. Mackay, on a subsequent day, stated that, when in the neighbourhood of Killarney, he was informed of an extra-

ordinary species of large black frog, which existed in considerable numbers there. Supposing he was about to witness a new variety of the species, he proceeded to pull down an old wall, where he found several full-grown toads. This fact, opposed as it is to the general disbelief of their existence in Ireland, occasioned a considerable sensation. A member stated that there exist two distinct varieties [species] of the toad in England; one so active as to run about with the rapidity of a mouse, and the other is the common toad. The former is distinguished from the latter by a yellow line down the back, and two spots on the front of the body. [Query—Is not this last the *Rana rubeta*, or *Nether Jack*, generally found in hollow trees.]—Dr. Neill made a communication on the seeming torpidity of a land-rail; it was found in Orkney. When brought near the heat of a fire, it was restored, but died shortly afterwards. Dr. Drummond stated the common *gordias* to be viviparous. When put into the same vessel of water with a common newt, the latter animal became alarmed, and, in a short time, the *gordias* twined round and killed the newt.

“Some observations of a highly interesting import were made by Professor Daubeny on the circumstances affecting the exhalation of moisture from the leaves of plants, the influence of light and heat together, and of heat without light. A very interesting discussion arose out of this subject.”

The above extracts are a small portion of the matters discussed by the members of the British Association at their late meeting in the city of Dublin, for which we are beholden to the report published in “The Irish Farmer’s and Gardener’s Magazine” for the last month. We much approve of such an association, being convinced that both the arts and every branch of science will be greatly advanced by the interchange of the ideas and opinions of such an assembly of learned men.

*Hortus Siccus*.—“In the study of botany, it will be found very advantageous to prepare a book, or folio, of dried specimens of plants. Such a book is called *hortus siccus*, a dry garden. Select from the plant a flourishing and vigorous piece, bearing leaf, flower, bud, and, if possible, seed; lay it upon thick blotting paper, with one or two sheets of the same over it, upon which, unless the plant be very thick and succulent, lay another specimen, and then more paper; be careful to lay each leaf and flower smooth and flat upon the paper; let no part of the specimen be under another part; cut off with a sharp knife any leaf that cannot be disposed without touching or crossing another; and if any bud or flower be too thick to

lie properly, cut off the under part, taking care to leave the stamens and pistils. In the case of any plant particularly full of sap, a hot iron may be passed two or three times over the covering sheet of paper.

“When the specimens and paper are arranged, place a heavy weight upon them; after a few hours, gently shift the position of each specimen to a dry part of the paper, and replace the weight: repeat this, changing the paper, if necessary, until the specimens be perfectly dried; then prepare a solution of gum, with a little camphor in it, and secure each specimen to a page in a folio of cartridge or whitey-brown paper. A little practice will enable the learner to do all this with ease and expertness.

“Next, write under each specimen the name of the class and order to which it belongs; its genus and species; whether it be a tree, shrub, or herb, and the country of which it is a native.”—*Stewart's Outlines of Botany.*

*Town Gardens.*—“In forming a flower-garden, the principal considerations are, to secure a good aspect, a situation near the house, and a good soil. In small gardens, and especially in a town, the second point is of certain attainment; but with regard to the first and third, there can be but little choice. Much may, however, be done to improve an unfavourable aspect by planting shrubs and trees for shelter; and the soil, if too light, may be aided by strong loam; if too heavy, by lime, sand, or ashes. No soil is more suitable for a flower-garden than a light loam.

“Draining must be attended to, or the best soil will not ensure success. A very common error in planning and laying out small gardens, is the want of unison in the different parts. Trees and shrubs are planted without any view to the whole; the flower-beds are so shaped and disposed, that any of them may be changed in form or taken away without rendering the general effect either better or worse; and the walks wind through the chaos without any apparent object but caprice. Thus the garden possesses no other beauty than that derived from the separate forms of the plants which it may contain.

“The flower-borders should be arranged in flowing lines, and for every turn of the walks there should be some object in view, such as to avoid the obstruction of a group of shrubs, or to discover some new beauty hitherto unseen.

“The particular shape of the ground must, of course, depend upon the owner's taste. I shall merely observe further, that I consider the usual manner of laying out town gardens anything but good. I would pro-

pose to vary the walk, so as to give it a more interesting character, and would keep in view some general plan, to which every detail should be subservient and conducive.

“A little rock-work would have an excellent effect, and might be composed of flints, and of bricks run together in the kiln, which last are called burs. Trees and tall-growing plants should be placed at the top, and small flowers and creepers at the bottom of the rock-work, or it will have neither beauty nor effect.

“The soil in a town garden becomes, in a year or two, completely saturated with soot. This evil is, in a great measure, without remedy; but something may be done by procuring a little fresh earth, and laying it on the old soil. Fresh loam from a common is the best for this purpose.

“Gravel must be annually renewed, or it will have a very sombre appearance. There is no better gravel than that of Kensington. I have heard of gentlemen having it carried by sea to their gardens in Wales and the north of Scotland.

“Manure will be found very requisite, for without it the ground cannot well support strong-growing herbaceous plants for two years in succession. I should recommend that a very small quantity of lime be laid on the ground in one year, and thoroughly decomposed stable manure, about two inches deep, in the next year. November is a good season for laying the manure on the ground; and it should be dug in and thoroughly mixed with the earth to a considerable depth when the borders are trenched in March.”—*Ibid.*

*Embellishment of small Areas.*—“Cultivation of taste for picturesque horticulture is too generally neglected, through erroneous apprehension of its requiring an extensive field for practical experiment, or through inadequate conception of its inexhaustible fund of gratification to an ardent devotee. But the principles of true taste may, with perfect facility, be developed, and be productive of happy effects, on a very reduced scale. About three-score years ago, a perfect nuisance to the city of Exeter, its southern castle-ditch, was converted into one of the most elegant pleasure-grounds in the kingdom. Recently, the site of its northern ditch has sustained similar improvement; the former not approaching two acres, the latter scarcely exceeding half an acre;—nay, a trivial area, not larger than an ordinary sitting-room, may and has been modelled on a principle of correct picturesque character. It is vexatious, therefore, to witness the egregiously tasteless disposition of areas in public squares, and in fronts of rows of houses.

“The space of only a few yards might be converted into a tasteful

picture by judicious arrangement, but for the house-builder's usual obstruction to taste, by constructing an entrance, the centre of the boundary fence. Placed but a few feet from the angle, it admits concealment by shrubs, and allows an unbroken grassy slope to be formed, surmounted by evergreens, against the road, and extending about two-thirds of the side opposite the walk, such walk not exceeding in width three feet and a half, and drawn with a very slight degree of incurvation, just deviating from a straight line, acuter at the commencement, and obtuser on approaching the termination. From want of space for shrubs, the side-fence adjacent to the walk should be clothed with Irish ivy, that opposite admitting a screen of perennial shrubs of the class already recommended, viz. *laurestinus*, *phillyrea*, *pyracanthus*, *arbutus*, &c. Three handsome evergreen shrubs are frequently a sufficient number for detached position, the *phillyrea* being placed near the entrance, the *laurestinus* near the obtuse incurvation of the walk; and the *arbutus* on the opposite side of the area, at nearly two-thirds distance from the house. In front of the shrubs, that delicate contrast to their deep hue, annual stock, should abound, preceded by the vernal flowers. Passing from the front along the side, the slope should be incurvated, and gradually continue diminishing in height, without an abrupt termination. The grass should extend from the upper part of the slope nearly to the house, leaving only a few inches of parterre for roses, mignonette, and other sweet-scented annuals. An area, thus disposed, could not fail to please, by its simple and natural character.

"The finest illustration of the possibility of producing beautiful effect on a small scale, is a plantation of evergreens on the city side of the Colosseum, in the Regent's Park; it forms the richest, grandest, most sumptuous, and judicious arrangement of trees and shrubs ever produced within such trivial space. Constituting a most beautiful screen to the Swiss cottage, it may justly be esteemed an incomparable model for general imitation in areas similarly circumstanced, and should be minutely copied in the flanking plantations of every splendid mansion. It does more than supply exemplification of the directions herein before given. In the British metropolis, such a superior specimen of tasteful selection and scientific disposal of trees and shrubs was peculiarly required, in a spot sufficiently detached from the influence of its smoky atmosphere, so deleterious to vegetation as to render evergreens in the areas of every square deciduous.

"It is of material importance to the enjoyment of a garden, even of the smallest scale, to form from its commencement, previously to the shelter of trees and shrubs, some immediate provision for a shaded walk. It may be accomplished the very first summer, by two rows of

the golden willow meeting in an arch, and fixed by cord to groinings of the same material, both lateral and parallel to the line formed by the points of the intersection. The first year's, and perhaps the second's, defective foliage should be thickened by runner-beans—inexpedient the third year, from the willow's full-sized leaves and two years' shoots. To the termination of such shaded vista, productive of the solemn impression of gloom, through contrast with the surrounding sunshine, is adapted a cinereal urn, supported by a pedestal of correct proportion. This decoration combines elegance of effect with cheapness of purchase, being obtainable, in the vicinity of free-stone, at the trivial expense of five-and-twenty shillings, although of competent size and beautiful shape. In less favoured districts, a succedaneum may be supplied by a painted, coarse, earthen jar, covered with a top turned to the pattern of any common urn, and placed on an oblong-squared wooden base. In the absence of stone, a pedestal may be supplied by a squared and oblong block of wood, or by a pile of brick-work, surrounded by a carved base and sur-base. The entire cost is very trivial indeed, although the ultimate effect be good, as furnishing a handsome and corresponding appendage. Such a diminutive avenue is merely suggested for convenience, in the absence of superior accommodation for shade; and by the assistance of a few exterior shrubs or creepers, particularly if placed by the side of a bushy hedge, is not attended with stiff appearance.

“Parterres, or flower-beds, require consideration, to prevent a garden from disgracing, by discordant character, the contiguous lawn, when planned on principles of picturesque taste. While architectural vistas were imitated by planted avenues, the charge of inconsistency could not be advanced against the disposition of a flower garden into beds of unnatural shape or geometrical figure, not unfrequently assimilating with the ridiculous shape of what is termed a ‘Pope-Jean table.’ Happily, this Dutch style was for some years superseded by one of superior, because of more natural, character; but, in consequence of renewed intercourse with France, through the termination of the revolutionary wars, English principles have been injured, and English taste impaired by adaptation to the French style. Among other innovations, French parterres have been introduced, through a servile, indiscriminate imitation of French fashion, producing contempt of natural beauty, imitated by horticultural art. But, unless it be really accounted as well to be out of the world as out of the fashion, the modern devastator of a good grass-plot, for the idle purpose of cutting out rondos or ovalos, triangles or quadrangles, double hearts or single diamonds, true-lovers’ knots or hateful labyrinths, should consider

whether, in the adoption of such taste, he excel, by very many degrees, his grandfather's metamorphosis of a box-bush into a round stool, or of a yew tree into a dumb waiter, a prince's coronet, or a fantail peacock.

"In the formation of a pleasure-garden, although the leading object is to please the eye, as being productive of paramount delight, and the next in order to charm the ear, by providing attractions for melodious winged visitors; yet a third is to supply gratification to the olfactory sense. A garden is incomplete until converted into a wilderness of sweets; even that humble weed, designated as the Italian's darling—the mignonette, should be suffered to spread with luxuriant wildness; and, fortunately, it has such tendency, if uncontrolled, and merely allowed to ripen and shed its seed."—*Dennis's Landscape Gardener*.

*Observations on Garden Husbandry in Ireland.*—"The poor who occupy the margins of our numerous bogs, are, generally speaking, the most miserable of our rural population, having to contend with extreme dampness of situation, and being without other food than potatoes, wofully destitute of the farinaceous quality; yet many of those wretched people, who seem to have nothing to counterbalance the natural evils of their unhealthy location and the want of clothes (consequent upon want of employment, in the bog districts, during nine months in the year), but abundant fuel, might, in many cases, improve their condition very considerably by adopting a system of garden culture, which is also peculiarly applicable to many mountainous and rocky districts, in which a patch of peat soil often presents itself, only requiring a small degree of labour to be converted into a profitable garden.

"I am led to make this observation just now, from having recently witnessed innumerable instances of the combined effects of sloth, carelessness, and ignorance, exhibited in the provinces of Munster and Connaught, where I had lately occasion to travel, in order to purchase cattle. I shall give an instance, which, I fear, is by no means a peculiar illustration. Midway between Killarney and Kennare—a mountain region of extraordinary beauty—stands the cabin of James Moriarty. The family, consisting of eight individuals, were at breakfast when I entered, at eleven o'clock. Of the six children at the breakfast table, two were without any clothing, except ragged shirts; a third had the addition of a tattered pair of breeches, but without the accompaniment of a jacket or waistcoat. The youngest, an infant, was laid asleep in a small turf kish,

Obliged a double debt to pay;

and the eldest two were tolerably clothed; the father sufficiently so;



and the mother, amidst a scene of the most apparent poverty, and the most unquestionable filth, was tidy in her own person, and of a smiling, contented countenance. She assured me that 'her children did not mind being without clothing in the summer, and that she hoped to put something on them before winter.'

"In answer to my inquiries as to the fashionably late hour at which the family were taking their morning meal, I was informed by the woman, that none of the labouring poor of the county of Kerry (and I have since ascertained that she stated an appalling fact) take more than two meals in the day—one at ten or eleven—the other at the conclusion of the day's work; and that the children lay in bed until a very late hour, for the purpose of putting the hunger over them.

"The father of the family did not appear to feel their wretchedness; he sat listlessly at the fire, and appeared to be without any source of employment; yet, opposite his door is a bit of peat soil (which a professed gardener would value at a high rate), in a state of absolute unproductiveness, although, in two days, James Moriarty might drain it completely, and render it a fine cabbage-garden, to supply, with a bit of bacon, the want of potatoes, then selling at fivepence and sixpence per stone.

"This small piece of fine garden soil is bounded on the mountain side by a picturesque rock, and by a fence on the road side, with a *dyke*, into which Jemmy has only to conduct two or three small drains, that would effectually drain the now waste spot, which has an inclination of two feet in twenty, insufficient, in the estimation of the owner, as he assured me very gravely, for the simple operation which I earnestly suggested. Now the condition of this man (and there are many thousands under precisely similar circumstances in the south-west parts of Ireland) might be incalculably bettered by energy and a desire for comfort. Moriarty is one of a joint-stock company—two or three brothers or cousins—who hold an undefined (as to acreage) extent of mountain land, for which they pay ten pounds per annum, and which has several boggy flats within its limits, requiring but a few unexpensive drains, and a little lime, which, though in the neighbourhood, is rarely, if ever, applied.

"The advantage of having early spring cabbage, when potatoes are bad and dear, would, it might be supposed, induce even such a lazy creature as Jemmy Moriarty to cultivate them; for, if they be inferior as food compared with potatoes, they are at least better than no potatoes, and would supply a third meal, which is surely indispensable to the adequate nourishment of every poor man's family. But Jemmy won't render this spot productive of anything;—this I foresee from the

obvious apathy and indolence of his character. He is not a man who will ever make a steady effort to ameliorate his condition ; nor do I see how he, and a vast proportion of the peasantry of the southern and western districts of Ireland, can be led to an improved condition, without the active superintendence of agents, insisting upon the practice of garden culture, and authorised to afford the necessary facilities, and supply models of practical good management on the properties intrusted to their charge. The condition of the peasantry, in the districts to which I have just now referred, is lamentably bad, and likely to continue so, as far as existing appearances warrant the inference ; and until garden husbandry be generally established, no substantial improvement can be expected in the habits or the comforts of those whose miseries are now extreme, and yet so little understood, and so criminally unheeded by those who are awfully responsible for the degradation and bitter sufferings of their condition.

“ And it is especially to be deplored, that in those very places (the mountain and bog districts) where land is of little or no value at present, and where it is naturally the best for gardens, no care is taken to render it available to the comforts of the poor.

“ An example of what bog-land properly reclaimed will do, in the way of garden, may be seen by the great flow-bog near Limerick, consisting of one hundred and eighty-four Irish acres, which Messrs. Steele and Browne have taken for the purpose of supplying fuel to their distillery at Limerick. A few years ago this spirited company commenced their first operations, by building in the bog a neat slated cottage for their very active and intelligent manager, which is so deep, that the roof of the house (based, however, on the firm subsoil) was hardly visible from the Shannon, which bounds this track on the western side.

“ In the course of a few years, after dividing the bog by straight drains, intersecting each other at right angles into sections containing about six acres each, and cutting away the peat in regular courses, a considerable extent has been converted into meadow land, and a garden formed adjoining the house. The portion devoted to garden, like the other reclaimed parts, has not been sunk to the solid subsoil ; it is elastic to the tread, yet sufficiently consolidated by a covering of bluish clay, two or three inches in depth, laid over the fibrous and refuse portions of the abstracted peat, and incorporated with it by the successive operations of the spade.”—*Irish Farmer's and Gardener's Mag.*

## CALENDARIAL MEMORANDA FOR OCTOBER.

## KITCHEN GARDEN.

IN this month there are several rather important operations to be executed, and by which some of the most valued culinary vegetables arrive at perfection in the spring.

*Cauliflower.* If the seedlings sown in August are large enough to be transplanted into hand-glasses, it should be done before the end of the month. See directions for this work in our August number, together with the methods of preserving the plants through the winter.

Michaelmas cauliflowers are now coming into use: see that the plants are secure against wind, by being well earthed up, and protect exposed heads from night frosts.

*Peas.* Towards the end of the month, sow the first crop on a dry, south-lying border, screened from the north by a wall or other fence. The early Warwick, early Frame or Charlton are the best for sowing at this season. See last number, page 327.

*Beans.* About the middle of the month put in the first crop of the Mazagan beans, to stand through winter. A dry south border is the only station where they may be expected to survive the cold season; if they escape, they will yield pods at an acceptable time.

*Cabbage.* The principal spring crop must be planted in this month. Rich, well-digged, or trenched ground, and in an open situation, is most suitable. Plant in rows two feet apart every way, or put in a double quantity on the same ground at half these distances, with the intention of removing every other row, and every other plant in the remaining rows, to another piece of prepared ground, at a future opportunity, to come in as a succession crop. Preserve the seedlings remaining in the seed or nursery beds, to supply plants for future plantings in the early spring.

*Spinach.* See that this crop be kept clean and properly thinned.

*Broccoli.* Some of the Cape sorts are now fit for the table; and the different succession plantings of the common sorts will require hoeing among and earthing up. All other tribes of winter greens, disposed in the same order, will require similar attention.

*Celery.* All the advancing crops must be kept occasionally earthed up in dry weather, but never too much at one time, as the hearts of the plants should always have perfect freedom to rise. Cardoons should be earthed in like manner.

*Endive.* Full-grown plants may be blanched as wanted; and now is the time to remove a good quantity into frames, or other suitable places, where it may be covered and blanched for winter use.

*Lettuce.* Plants raised from seed in August and September will now be fit for removal into winter quarters. Frames or hand-glasses close to the base of south walls, or narrow beds on warm borders, that may be hooped over and covered when necessary, are the usual means of preservation. It should be observed, however, that they should never be deprived of air and light *unnecessarily*, for the more they are nursed at this season, the less hardy they become. Small beds of the hardier sorts of lettuce may be sown on a dry sunward spot at this time. If the seedlings survive the winter, they will be useful in spring; if they miscarry, the loss is not great.

*Carrot.* A small bed of the Early Horn may be now sown on a south border. This, covered in severe frost with peas-haulm or dry fern, may preserve them for use.

The other business of this month is, again sowing salad herbs and a few radish, and raising the principal crops of carrots, parsneps, potatoes, beet, salsafy, skirret, scorzonera, and Hamburg parsley for storing. This is usually done in hovels or sheds fitted for the purpose; the roots laid together in a perfectly dry state, or embedded, stratum super stratum, in dry sand. Mushroom beds may now be spawned.

*Trenching, &c.* All vacant pieces of ground intended for spring crops should now be trenched or double-digged, adding good dressings of dung where wanted. If the soil be heavy, lay it rough, or in ridges; if light, quite smooth. Prepare composts by collecting the different materials of which they are compounded, in order to be put together before or at the time when wanted.

**FRUIT GARDEN.**—Gathering fruit, when the weather is fine, must be attended to during the month. Pears and apples for keeping should be gathered just before they are ripe, and be very carefully handled. The least bruise is injurious; and therefore, in storing them in the fruit-room, much caution is necessary. Wall trees may be gone over once more, to remove irregular growths, and to stop the growing points of all shoots likely to bear fruit in the following year. The autumn-stopping of the shoots of fruit-trees which bear on one-year-old wood, is a good plan, if done at the proper time; but this we must more particularly advert to at some future opportunity.

The end of this month is the best time in the whole year for removing fruit-trees; if, therefore, anything requires to be done in preparing the places for the reception of new trees, it should be done without delay. Much depends on the right preparation of the soil, as well as on the

care bestowed in raising and replanting the trees. If on walls, the proper aspects should be regarded for the kinds ; and if in the orchard, attention should be paid as to whether they are large or dwarf-growing sorts.

As the eggs of most of the insects which infest fruit-trees in the spring and summer are laid on the branches in autumn, it is an excellent plan to wash them frequently after the fruit is gathered with soap-suds, tobacco or lime-water, or with a decoction of the leaves and stems of the common fox-glove. This decoction should be made with boiling water, the more effectually to extract the nauseous principle of the plant. These applications, if continued through the winter and spring, would go far to prevent the trees being chosen for nestling places for the insects.

Fruit-trees established in pots for forcing should now be shifted into larger pots, if necessary, or, if not, should have the surface of the earth in the pots refreshed with an addition of new rich compost. If their bearing-wood be well ripened, the pots may be set under a north wall ; but if not, they should be kept on a south aspect.

FLOWER GARDEN.—Dahlias are still in beauty, and only require firm staking against wind. If any new seedlings have not yet flowered, and are expected or promise to prove excellent, they should be guarded by some temporary covering against being nipped by an unexpected night frost. Chinese chrysanthemums, standing in the open borders, are in the same predicament ; their flower-buds may be destroyed before they open, if not screened by some light covering. Those in pots are easily removed to a place of safety. All kinds of green-house plants should now be housed, if not already there ; and all tender plants plunged in the borders for summer show, should be taken up and housed, if worth saving. Pinks may still be bedded out, and carnation layers potted. These, as well as auriculas, and all other flowers in pots, should be duly assisted with water. About the end of the month prepare a heap of light sandy loam, and a sufficient number of pots for the reception of as many bulbs and tubers as are intended for early flowering ; such as polyanthus, narcissus, tulips, hyacinths, crocus, &c. Prepare also the beds for tulips, hyacinths, anemones, and ranunculuses in the fixed places, to be planted next month. Dig the clumps and borders for hardy bulbs and tubers, which now require to be put in ; as crocus, snow-drops, aconite, &c. Begin pruning shrubs as soon as the leaves are off. Pot roses for forcing, as well as Persian lilac, and the different sorts of American and other plants proper for forcing. Sow some more pots and boxes of mignonette, to go into frames ; take up overgrown roots of perennials, part and replant them ; plant out also any seedlings of those yet remaining where sown.

## REMARKS ON THE WEATHER.

IN our last month's notices of the weather, we then predicted that a change would shortly take place. Several thunder-showers fell soon afterwards in different parts of the kingdom ; but it was not till the 8th of the present month that the long series of dry weather was broken up ; and since that date we have had much rain both on nights and almost every day.

No one can complain of a dry summer, because, *nationally*, it has always been considered as doing much good, in so far as it brings the grain of the *richest land*, and the fruits of the orchard and garden, to the greatest perfection. Partial losses it certainly occasions, as the farmer's turnips, and the gardener's late crops of salad herbs ; but, while

Partial evil is universal good

there is no room for peevish regret. The rain has come too late, perhaps, for potatoes and several other culinary plants, which could not be assisted by the watering-pot ; but, from the great heat of the earth, and rain together, the growth of everything, for a month to come, may be expected to be very rapid, more especially if frost does not set in too soon.

Our autumns, for the last five or six years, have been remarkably mild, no frost to speak of happening before Christmas, and but little afterwards. This should not throw us off our guard in the present year ; for though at present there is a prospect of a dripping season, sharp frosty nights may intervene unawares, and cause injury when least expected. In this changeable climate, the gardener can hardly be too vigilant in guarding against extremes. The frosts of winter, and the sun-beams of summer, are equally hurtful to tender vegetation ; and he who most effectually provides against those, must necessarily be the most successful in his business. This conclusion admits of one exception, however, and requires particular notice at this season of the year, namely, attention not to overdo protective measures ; because, if tender plants, such as cauliflower, lettuce, &c., which we wish to preserve unhurt through the winter, be, at this season, deprived of light and full air *unnecessarily*, they suffer severely ; because they become ten times more liable to injury from cold, than they would otherwise be if constantly exposed to air not below thirty degrees of Fahrenheit. Another circumstance deserves notice this autumn particularly :—during the dry weather, seedlings rose and grew slowly ; and now fine rains having fallen, extraordinary vigour will be imparted ; and in this vigorous state very probably they will be assailed by frost, and consequently suffer more than if in more moderate growth.

*September 24th, 1835.*

PAXTON'S  
HORTICULTURAL REGISTER,  
NOVEMBER, 1835.

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HORTICULTURE.

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ADDITIONAL REMARKS ON COILING VINES.

*Welbeck Gardens, Otterton, 10th Sept., 1835.*

SIR,—It may be necessary that the following remarks be incorporated, in their proper place, where you may think fit, in the paper which I lately forwarded to you upon the subject of vine culture, by coiling the cutting into pots, according to its strength.

The soil which I make use of for my vine in pots is about two inches thick of the turfy sod from a fine sheep-walk or pasture-field. I use *that* mostly from the top of a limestone rock, with a mixture of some of a much sandier nature; but I like all chopped up green, and used as fresh for my coilers, both at first planting and future shiftings. I wish to state this lest much of my success may depend upon the sort of soil I use, and that it may be the cause of the want of success in others that a similar compost is not employed. It is the soil that I use generally for all my border vine and wall trees, when they require renovation; and, in many situations, a renovation of the kind would be very advantageously applied every second or third season.

I place all my coilers *directly* into a strong bottom-heat of from ninety to one hundred degrees, whilst the atmosphere of the house or pit has a temperature of from sixty to seventy degrees at night, and from seventy to eighty degrees in the day, during the time they stand in need of any bottom-heat higher than the temperature of the house they stand in, and to attend to keep them as near to the *light and air* as can possibly be done; and however powerful the light may fall upon

them, if it be intercepted by the glass at a considerable distance from them, they must never be expected to either set their fruit well, mature it, or to ripen their wood with any probable chance of its being fruitful the following season.

I have stated in former communications, that such as I select for fruiting the first season, I cover over their main stems with moss, which I keep moist by sprinkling them night and morning with water from a cistern *inside* the house ; my object for which is, to keep the temperature of the stem, as much as I can, beneath that of the house, and to prevent evaporation from the branch as much as possible, until an abundance of vigorous roots are induced, and the grapes perfectly set ; after which period they are *perfectly safe*, with judicious attention, when they are best removed from the bottom-heat to a curb or flue, where plenty of *light* and air can be had. By such treatment I have succeeded very far beyond my most sanguine expectations ; and the method is as simple as any in the art, and the attention trifling to any active mind, where suitable accommodation is at hand. In a former number of the Register I gave plans for some economical pits for such purposes, where more expensive ones may be an object, if not previously upon the spot.

Were I to deviate from the treatment which I have stated, I believe that I should be unsuccessful. Reasoning upon the habits of the vine, I was induced, by a momentary thought, to adopt the method I pursue, and, for the *first* season, am as successful as some are for years by old-established vines.

I believe there are some that are too bigoted in the opinions which they have formed of their own, and consequently too proud to be dictated to by another, that they are blind to any reasoning but that suggested by themselves.

I do not believe that the method directed by me has been attended to by those who have not succeeded in the system, or they could not have so completely failed ; and it is proved here that the arguments against it amount to nothing but nonsense, and do much injury to an important object in the art of horticulture. I hope that you will soon take up the subject in a very different light to that of Mr. Fish, in the Gardener's Magazine ; and if you will condescend to pay me a visit at Welbeck, I shall be pleased to lay ocular proofs before you, which will ever confound theoretical reasoning.—Your obedient servant,

JOHN MEARNS.

[We are much obliged to Mr. Mearns for these additional facts, as well on behalf of our readers as ourselves. We, indeed, were not before



aware that a rootless shoot could bear so strong a bottom heat as ninety or one hundred degrees, without suffering from such excitement ; but the fact is conclusive, and therefore we have only to mark it as a newly-discovered property of the vine, with which we were before entirely unacquainted. Mr. M. may rest assured that we have great pleasure in giving publicity to his statement ; and though we reserve to ourselves the privilege of commenting on any matter offered to our notice, we most certainly will never endeavour to undervalue anything which promises improvement on the practice of gardening.—*Ed.*]

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## REMARKS ON THE EDITOR'S COMMENT ON COILING VINES.

BY MR. ROBERT FISH.

SIR,—In looking over the September number of the Horticultural Register, I was much gratified with reading your remarks upon the question “Whether the successful or unsuccessful practices of gardening contribute most to the improvement of practical men,” and particularly that part in which you advert to professional periodicals as a means of exciting and promoting a spirit of inquiry, and in the pages of which due legitimate criticism will ever be sure of finding a place. Encouraged by these remarks, and also by the straight-forward manner in which you have acted in the various discussions in which you have been engaged, I venture to call your attention to another paper in the same number, respecting the coiling system of vine culture. In doing so, I beg to assure you, that, actuated as I have been by no feeling but the desire of establishing truth ; and that, being fully convinced of the propriety of my conduct in calling in question the utility of the coiling system as at first propounded ; it is a matter of comparative indifference to me what opinion you may form of its utility, or of my conduct in doing what you term “scouting the idea merely from the failure of a first trial.” But, Sir, I conceive it to be a matter of some importance to me, and of great importance to you, as the editor of a public journal, that the sentiments which you advocate respecting any system, should be those founded upon a knowledge of the facts connected with that system, and not upon premises of your own making, as I am convinced has been the case when, as the foundation of your remarks, you lay it down as a proposition, “that the idea has been embraced by some of Mr. Mearns’ brethren and their masters, with much more confidence in its efficacy than ever it was intended it should have been by the inventor himself.” Opposed as this proposition is to what were my own and others’ ideas respecting the system, it is not more at variance with the

facts of the case than your inferences from it, respecting the practice which you say would be adopted by Mr. Mearns, are different from the statements which have been made by that horticulturist.

Feeling pretty well satisfied with the propriety of your inferences, and leaving it to Mr. Mearns to correct your misconceptions where he is concerned, I trust you will take the trouble to read some of that practitioner's first letters respecting the system, and then say if your expectations of success could well be higher than the author gave reasons for anticipating. I am sorry I have not got the necessary documents beside me, but from a memorandum of facts, I would direct your particular attention to the letters of Mr. Mearns contained in vol. ii. p. 491, vol. iii. p. 104, of the *Horticultural Register*, and vol. x. p. 138 of the *Gardener's Magazine*; from which you will perceive, first, that success is spoken of in the most confident manner, and that too so ample in its extent as to enable the author, with the assistance of little more than twelve lights of framing, to insure the production of from five hundred to one thousand bunches of matured grapes; and, secondly, you will be pleased to observe, that this extraordinary success is spoken of purely as the result of the first season's culture. This I consider more necessary to be attended to, because I perceive that *now* both you and Mr. Mearns seem to advert to the second season as the period when the system will be attended with general utility; while I contend that success the second season formed, and could form, no distinguishing characteristic of the system; nay more, that the manner in which Mr. Mearns incidentally alludes to the treatment of those plants which might be kept a second season, advising the cutting away of their roots, clearly indicates that, at that time, he did not practise, or at least did not recommend his system for the rearing of plants which were to fruit in a following year. Disposed as I might have been to call in question the utility of the coiling system, even in the second season, as I might that of any other system of cultivating the vine in pots, unless in circumstances where the vineries were insufficient to produce the requisite supply, and yet plenty of the means of labour at command, I certainly never should have publicly expressed my disapprobation of the coiling system, if I had not been fully convinced that the great success spoken of referred to the first season, and that alone. If Mr. Mearns had spoken of his system as one by which there was a possibility of obtaining a little fruit the first season, and by proper management (such as judicious stopping, &c.), a certainty of securing a crop the second season, there would then have been little disappointment experienced by gardeners upon the subject. From not having read the *Register* quite regularly for this some time, I may be labouring under a mistake; but

so far as known to me, no allusion was made to the system as a means of preparing plants for fruiting in the second season, previously to the month of May of the current year, and that too merely incidentally. Certain I am that I never heard of such a circumstance when I wrote my views respecting the system; and at the present moment I am not aware of any means having been resorted to by Mr. Mearns to inform the public that, although grapes may be obtained the first season, the success would neither be so great nor so general as he at one time fondly anticipated. Instead of such a candid statement, which would at once give satisfaction to all parties, Mr. Mearns seems determined upon maintaining, through *thick and thin*, all and every part of his system, careless whether his present and former statements should harmonise, or be somewhat in discordance with each other, and regardless of a question which is now being put, and answered too—"How does it come to pass that, if Mr. Mearns is so successful the first season, he should expose himself to the labour and loss of time requisite for the rearing of plants that will not fruit previous to the second season, especially when he tells us that his established vines produce abundance of wood suitable for his purpose?"

Having commenced this inquiry in the *Gardener's Magazine*, I am so convinced of the propriety of finishing it there, that I should not have taken notice of your remarks, and far less have directed your attention to the statements of Mr. Mearns, if I had not perceived that he had taken the trouble to direct your attention, not to your misconceptions, but to certain *facts* stated in the *Gardener's Magazine*, corroborative of his success, and consequently a *sufficient* answer to my letter of inquiry. My opinion of these facts will appear in its proper place. Meanwhile, I shall content myself with joining Mr. Mearns in recommending these facts to your careful perusal, hoping at the same time that, as an act of justice, you will read with equal care the letters to which I have already referred you, as also that paper of mine which these facts are designed to answer; and then, but not till then, will you be fully capable of pronouncing your opinion whether or not these facts do sufficiently corroborate the statements contained in the former, or prove a suitable refutation of the arguments, and a satisfactory answer to the simple questions contained in the latter.—I remain, &c.,

Yours very sincerely,

ROBERT FISH.

*Hyde-Park Corner, October 12, 1835.*

## ON THE DISEASE CALLED "SHRIVELLING" OF GRAPES.

*To the Editor of the Horticultural Register.*

SIR,—At page 350 of the September number of the Horticultural Register, Mr. John Mills has solicited the assistance of yourself and your correspondents to the elucidation of a disease incident to grapes, commonly called "shrivelling," or "shanking." You have given your opinion; but, as I think you are labouring under a misconception of the disease, I take leave to hand you a few bunches of grapes for your examination, and likewise a hint or two on the subject.

Seeing the importance of Mr. Mills's inquiry, I have taken a deep interest in the subject, and have consequently turned over the pages of all the horticultural works I could procure, but, I am sorry to add, without arriving at any definite conclusion as to the "cause, prevention, or cure of the disease." In looking over the sixth volume of the Gardener's Magazine, I find this subject has been treated on by Messrs. Archibald and Gordon. Mr. Judd has also given the subject his consideration in the Horticultural Transactions. Mr. Judd attributes the disease to the non-admission of fresh air early in the morning, or, in other words, to the want of an orifice by which the vapour in the house might pass off without condensing on the grapes; "for," observes he, (speaking of the condensed vapour,) "this is the destructive material; for as the temperature of the house is increased, an effect equal to scalding is produced on the cuticle of the berries, and hence the diseased appearance which they assume; and should the sun break suddenly out, the destruction becomes complete."

Messrs. Archibald and Gordon think the disease has its origin in the root, and that it is owing to the absence or inefficiency of the absorbent orifices of the fibrillæ (*spongioles*) to supply the plant with sufficient nutriment wherewith to support the crop; and as a proof of this hypothesis, Mr. Gordon cites an instance of a "friend of his, whose crops of grapes had suffered more or less for several years. Mr. Gordon visited him in June, 1816, when his grapes had suffered to a very great extent, and on examination, he found the border completely covered with a heterogeneous mass of vegetables, which, at his suggestion, was immediately cleared away, and the border pointed over. Since then the vine-border has been held perfectly sacred. In 1827 very few of the grapes suffered, and in 1828 they invariably remained perfectly sound." But, with all due deference to the opinions of so distinguished an individual as Mr. Gordon, I beg to ask one question, and that is, "If the disease originated from the inefficiency of the spongioles, or absorbent orifices, to supply the crop with the required aliment, would not the whole consti-

tution of the vine be more or less affected, and not merely a few berries on a few bunches, as is too frequently the case?"

A similar question may also be put against Mr. Judd's doctrine; for if the disease was caused by an over-moist and over-heated atmosphere, would not the syringing and shutting up of vineries early in the afternoon of warm days, have the same tendency to injure the young crop as the over-heated, condensed moisture of the morning? Yet this is an almost universal practice with all good gardeners, and one which is attended with the best possible result.

In the September number of the *Gardener's Magazine*, there is a paper on this subject from the pen of Mr. John Damper Parks, nurseryman, of Dartford. Mr. Parks thinks the disease originates from the foot-stalks of the berry not being grown sufficiently firm and hard, in consequence of being grown in too humid an atmosphere; and the palliative recommended is a more arid atmosphere while the crop is young. There is certainly something plausible in Mr. Parks's doctrine; but I cannot bring myself to believe this "is the only cause."

I shall now describe some of the circumstances under which I have seen the disease. It has been my fortune, or rather misfortune, to see more or less of it in all the places where I have lived. In 1832 I saw a complete failure in a crop of early grapes—so complete, indeed, that I do not think there was a ripe berry on all the bunches (upwards of two hundred) in the house. And what did this arise from? The answer is simple and conclusive. It arose from the pipe, which conveyed the water from the roof of the house, and which passed through the vine-border, having burst, and thus allowed the water to enter the border, instead of passing off to the main drain. Here, then, is a proof that the disease does sometimes originate from the absence of roots; for, on examination, we found three parts of the young roots of these vines completely perished and rotten from the saturated state of the border. But here, it must be borne in mind, the failure was general, and therefore cannot be taken as a proof of the correctness of Mr. Gordon's hypothesis.

In 1834 I witnessed this disease make considerable havoc on a White Muscat of Alexandria vine, in the large stove in the gardens of the Duke of Portland, at Welbeck. The disease commenced at or about the time when the grapes were making their first approximation to maturity. Mr. Mearns ascribed it to the want of "atmospheric air," and the preventative resorted to was of course a more abundant supply of that element. The sashes were accordingly moved a little, both at the front and back of the house, every day, so as to allow of a current of fresh air through the house; and so strong was it on very fine warm

days, that I have seen the leaves of the vines vibrate in the breeze. A little air was also kept on through the night; but, notwithstanding every precaution taken, and every preventative resorted to, the disease continued to increase, until every bunch on the vine was more or less affected, and until maturation was complete in those which were left. It is worthy of remark, that this vine was taken up in the autumn of 1832, and replanted in one of Mr. Mearns' "chambered borders:" this border was covered with glass, and a current of warm air passed (from the house) under and around the sides of it. Now this border was not cropped with vegetables, neither could it be saturated with water, unless it was manually applied; and other grapes ripened well in the same atmosphere, and therefore it stands aloof from all the causes yet assigned: the vine was also in exuberant health. Now what could cause the disease here? It would be rash for me to assign any reason; but it almost leads one to conjecture that there is a maturing principle inherent in the vine, and that this vine had not been planted a sufficient time to get that maturing principle properly organised or secreted, before it was called upon to mature a crop; and this conjecture is strengthened from the circumstance of vines always ripening a moderate crop better than they do a large one, and of old vines always producing fruit in a higher state of maturity than young ones do, in consequence, as I humbly imagine, of the maturing principle being more abundant in the old vine.

So far, then, I have concentrated the opinions of practical gardeners, as far as I have been able to obtain them; and I have also, as concisely as possible, described the circumstances under which I have seen the disease occur. I could add more, probably, without enhancing the value of this long paper; but I shall conclude, for the present, with expressing a hope that such of the readers of this paper as can throw any light on this subject, whether practical, theoretical, or amateur gardeners, will do so at their earliest convenience; for in doing so they will not only be conferring a great boon on their brethren of the nineteenth century, but they will also be conferring a benefit on gardeners even to the end of time.

For writing the above I may, perhaps, be thought presumptuous by some who know me, and especially by those who take "long practice" as the only standard of ability for such an undertaking; but for that I care but little, as I am conscious the subject I have taken up is one of great importance, and one which ought not to be allowed to repose unnoticed and unknown, because these long-experienced gentlemen do not please, or are not prepared to elucidate the subject.—I am, Sir,

Yours very respectfully, WM. PORT AYRES.

*Middlesex, September 30th, 1835.*

## ON THE PRACTICABILITY OF FECUNDATING FLOWERS, AS A MEANS OF RENDERING THEM FRUITFUL.

CARRYING branches of the male plants to the females of the class *Diœcia*, is an expedient practised by the ancient inhabitants of the warmer parts of Asia and Africa: so history informs us; and the effects and propriety of such manipulation has been repeatedly proved in modern practice.

Some of the palms, particularly the date-bearing (*Phoenix dactylifera*), was one plant, which, in countries where the trees were indigenous, constantly received this attention of having the male flowers suspended over the females in the season of flowering. The common fig (*Ficus carica*) also received this attention, and long before anything certain was known relative to the sexuality of plants.

In progress of time, however, the effects, so plainly visible and exemplified in the trees above named, led to further ideas on the subject; and it was reserved for the immortal Linnæus to prove incontestibly the doctrine of vegetable sexuality, and on which he founded his system of botany. The peculiar functions of the stamens and pistils being now confirmed, and seeing that the junction of the pollen of the anther with the glutinous summit of the pistil took place from their proximity to each other, or by the instrumentality of bees, or of the passing wind, it soon occurred to practical men that manual assistance might be as effectual, in many cases, as the accidental circumstances to which allusion has just been made.

Perhaps the first act of the kind was the old custom of manually impregnating the female flowers of the melon and cucumber; and in this case it appeared to be absolutely necessary, because these plants being shut up in glazed frames, where neither bees nor wind had access, the fruit might often miscarry, if not assisted by the manager's hand.

A digression may be allowed here merely to remark, that it might be worth while to institute an inquiry whether the plants forming the three classes, *Monœcia*, *Diœcia*, and *Polygamia*, be or be not more melliferous or odoriferous than others. Should this be found to obtain in any appreciable degree, it would be another admirable adaptation of nature to attain her ends through the agency of winged insects, which, while seeking food, are effecting another important purpose of which they are necessarily unconscious.

One step leads to another, and soon it occurred to vegetable physiologists that, as the pollen was so easily transferable from one flower to another, other effects might be produced by means of cross impregna-

tion, than merely fecundating the flower acted on: colour, bulk, and qualities might be transferred to the seed, and valuable results might accrue.

As many new varieties of both fruit and flowers had from time to time been introduced into cultivation, and by accidental means, which were not readily accounted for by those ignorant of the effects of foreign pollen, it became a point of practice among those best acquainted with the process to do by hand what was before only matter of chance. In this new tact of arboriculture, many signalled themselves in originating new varieties of fruit and florists' flowers; so that at the present time the process of cross impregnation is as easy and as certain as any other operation of gardening.

The above observations have been made in consequence of the very useful piece of information conveyed to us by Mr. Bristol, respecting the black Lisbon grape. See pp. 348 and 349 of our last number. The bunches of this variety, it seems, are very often imperfect, owing to many of the flowers being incompletely, or not at all impregnated by their own pollen. This defect may be occasioned by the imperfect development of the anthers, by the scarcity of pollen, or to its too early or too late dispersion. Whether one or all of these accidents be the cause of the unequal swelling of the berries, is not, perhaps, exactly known; but Mr. Bristol's expedient, it seems, is an effectual remedy; viz. to dash the flowers of another usually fertile and full-swelling kind against those of the uncertain bearer. Mr. Bristol says, any "black" fruited sort; but, we presume, the flowers of any colour will be equally effectual.

Handsome and equally swelled bunches are a valued property of a grape vine. Some of them, as the black Hamburg for instance, have almost every berry perfect; others, as the Dutch Sweet-water, have many imperfectly swelled berries, and cause a good deal of labour with scissors to make the bunches fit to be seen. Others there are of both those descriptions, which, if married at the proper time, in Mr. Bristol's manner, would make both equal.

A practical remark naturally occurs to be mentioned in this place, namely, sorts which are constantly liable to have unequal-sized berries should never be planted alone, and, moreover, never at the warmest end of the vinery; because, coming in flower first, they have no chance of receiving assistance (supposing they need it) from the flowers of later sorts, or from such as are farther from the heat.

We well remember having the charge of a vinery in which a Dutch Sweet-water was intentionally placed at the warmest end of the house, to accelerate still more its constitutional earliness. This vine always



bore plentiful crops, but very rarely any perfect bunches of equally swelled berries. Considering this defect to be constitutional, no remedial means were resorted to; nor were we cognizant, at that time, that such defect proceeded from any accidental or natural impotence of the sexual organisation, notwithstanding some of our contemporaries used then to dust the flowers of their white Muscat of Alexandria with the pollen of other vines, to ensure the setting of the fruit.

This kind of grape (the Sweet-water) is frequently planted on open walls, where it bears, and, in favourable summers, ripens well. It is worth remark, that the bunches in the open air are always more regular than those in houses, which is something like presumptive proof that confinement and fire-heat, unless very moderate, is less favourable to the functions of the flower than the open air.

There are several other varieties of vines which usually produce unsightly bunches, and which, if the tree be well used in other respects, may be assisted by the easy and rational manipulation practised by Mr. Bristol with the black Lisbon; and we strongly recommend the process to the attention of our readers.

Nor need such a process be confined to the vinery: other fruit-bearing plants are benefited by employing similar means. Filbert trees are often unfruitful in consequence of the male flowers or catkins being killed by frost, or withered by dry air before the females are sufficiently developed. The tree, which is thus deprived of the service of its own catkins, must necessarily be barren for one season; but if a bough loaded with healthy catkins be cut from another tree, and suspended over the first, perfect nuts, in the usual quantity, will be produced. Nor does it signify whether the borrowed branch be a filbert, as it has been found that a branch of the wild hazel does as well, if not better: showing that the wild original really possesses more sexual vigour than the highly cultivated and pampered filbert; a curious circumstance in itself, and analogous to similar consequences observable in the animal kingdom. It may be added, that filberts produced from such impregnation, if sowed and raised to a fruit-bearing state, would resemble the male parent much more than they would the female.

There is another circumstance which happens in a family having bisexual flowers (but only, as has yet been observed, to one variety of the genus), in which the female organs in some of the plants, and the male organs in others, are abortive; consequently neither singly can produce perfect fruit. A necessary practice is, therefore, to intermix them in planting, in order to have anything like a crop. This is no other plant than the Hautbois strawberry—a favourite fruit, but which is almost extinct, in consequence of the partial success attending its

culture. It seems that either the one or the other of them produce strong runners; and these being invariably preferred by the planter, the one sort only predominates in the new plantations, and hence disappointment follows.

We are in doubt which it is that sends out the strongest offsets, and to which we have said a preference is given by the planter, because we have in our eye a pretty large bed of this strawberry, every one of which are what are called females, "living," as the owner expressed himself, "in single blessedness." The fruit were all set, but no larger than peas; and of this size they remained till they withered away. At the other end of the same garden there is another bed of the same variety, of which a great majority are also females; but about the centre of this bed there stood, by accident, one or two male plants, and round them there was a fair sprinkling of fully swelled fruit; and these were the only return the owner had from his two large beds. Their "single blessedness" is, however, now at an end, because a parcel of the other sex has been lately distributed among them, and full proof of the union will be seen next year.

Were strawberries like the filbert, any other variety of the former intermixed with the sterile plants, would make all fertile; but those who have tried the experiment, say that the sexes must be of the same variety. In the instance alluded to, Keen's Seedling and Wilmot's Superb were both bearing profusely, and in the near neighbourhood of the barren Hautbois. All were well supplied with water while in flower, so that no difference could happen on that score. Fifty years ago, there was much less complaint of this defect of the Hautbois than there is now; but as the same thing happens in other plants not debilitated by cultivation, there can be no doubt of the fact.

But, again, there are some other valuable fruit-trees which are shy bearers, and are almost always barren, notwithstanding they often show plenty of bloom. The Gansel's Bergamot pear is one of those, seldom bearing till it is aged, and then only at the extremities of the branches, where the strongest flowers are borne. It has been long suspected that the bloom is somehow defective, and that it needs assistance from the pollen of other sorts: that of the Swan's Egg has been recommended, and it is well worth a trial. Barrenness of fruit-trees is usually attributed to a bad soil, or unfavourable situation, and this is often true; but where both soil and situation are known to be good (as shown by the fruitfulness of others), and there are no ostensible signs of debility about the tree, it growing moderately, and flowering well, and yet yielding no fruit, suspicion may be entertained that some part of the fructiferous organisation is imperfect, and attention should be

bestowed to find a remedy. It should always be kept in mind, that our fruit-trees generally are only *mules*; and imperfect formation, in such cases, is no uncommon thing; and as they may be originated by art, by the same interference they may require to be sustained.

The practice of cross impregnation is now so well and so generally understood as an auxiliary expedient for the purpose of obtaining new sorts of flowers and improved kinds of fruit, that it is unnecessary to advert to it here; but it should always be considered that, although much is already known respecting the powers and susceptibilities of plants upon and among each other, we do not yet know all, and therefore should be ever looking forward to increase our knowledge, and improve our practice in every possible way.

We have availed ourselves of Mr. Bristol's hint respecting the Lisbon grape, to compare it with other incidents of the kind, and to enlarge on the subject, with the sole view of calling attention to the matter, believing, as we do, that the most distant hint is very often sufficient to an active mind, by directing it to objects and incidents which otherwise might be entirely overlooked or neglected.—ED.

#### ON THE ELIGIBILITY OF DECORTICATING TREES, AS A MEANS OF RECOVERING THEIR HEALTH AND INCREASING FRUITFULNESS.

DISBARKING old and stunted fruit-trees, for the purpose of inducing fresh vigour into the system, is an old custom, and, what is rather remarkable, has been much more practised by amateur orchardists than by professional gardeners. By the latter, the operation of disbarking was deemed an unnecessary counteraction of the law of nature, and a kind of cruelty and violence which no organised being could bear without serious injury. The bark, it was urged, is the natural clothing of the tree, and trees must suffer if rashly and suddenly divested of it. This is certainly plausible reasoning; but when we look to the structure of a stem, and consider the manner of its accretion and decay, we may probably come to another and very different conclusion.

A stem or trunk of a tree is composed of three very distinct members, namely, pith, wood, and bark: these are present from the moment the infant plumula bursts from the seed. At the end of the first year, the pith occupies the greater portion of the diametric bulk, surrounded by a thin layer or cylinder of wood, and this, by the cuticle, forming the first layer of bark. At the end of the second year's growth, the same part of the stem consists of the pith, as before; two layers or circles of wood—the last being formed on the outside of the first layer,

and closely connected therewith, and covered exteriorly with two layers of bark, the first cuticle being pushed outwards by the new layer within, which is now called the *liber*. In the third year, a third layer of wood is added on the outside of the two first, and a new liber is formed, at the same time, within the two first layers of bark ; and thus the diameter of the stem is annually enlarged by a new layer of wood and a new liber, as long as the tree lives.

Now, as the pith and inner layers of wood are first formed, it is observed, in the generality of trees, that they are also the first to decay, very old trees being usually hollow ; and the first layer of bark is also the first to lose its vitality, or be thrown off in various ways. In some trees, it is biennially or triennially discharged in irregular flakes, like that of the *Arbutus andrachne* ; in horizontal lamina, like the birch ; in longitudinal strips, like the grape-vine ; or is rent into vertical fissures, like that of the oak. From these facts an obvious deduction follows, viz. that both wood and bark are only of temporary use in the system, and both are, like the leaves and fruit, excrementitious productions.

These are facts needing no proof ; and therefore, respecting the bark, it is quite clear that every layer which has already done its duty, and ceased to be a living organ, is afterward only an incumbrance, which may be removed with impunity. It is also manifest that, as every year's new growth is within the bark, the latter must necessarily be expanded, either by being periodically thrown off, or stretched horizontally, or rent longitudinally, as it is in the generality of trees. It is, therefore, a natural effort of the tree to be relieved from the constricting action of the bark, and may often need assistance in this way.

We know that there are many trees which, being placed in a rich soil and favourable situation, advance from the seed to their utmost stature, without appearing to suffer from constriction of the bark ; but many, and particularly old fruit-trees in orchards, are subject to what is emphatically called *hide-bound*, and without any means being taken to relieve them ; and it is surprising that a practical man, who is aware that such a defect exists, should employ no means as a remedy. It is true, we sometimes see the stem scored from top to bottom with the point of a knife, for the purpose of relieving a hide-bound tree, and sometimes with the best effects ; but an entire disbarking of the stem is seldom had recourse to, lest it should kill the tree outright.

But, to have a right understanding how far the bark may be stripped off without injuring the tree, we have to consider what its special use is. In its youngest state it is green and soft, and consists chiefly of cellular membrane, but vascular on its inner side. The exterior being

exposed to the air, is much more dense, and becomes what is called the cuticle, and the green cellular part within is the epidermis. The cuticle acts as a protection to the living membrane within, and in its vascular, interior the sap-ducts are embedded. So long as these ducts serve for the conduction of the sap, they are useful to the system; and were they destroyed while serviceable, the tree would suffer injury; but as soon as they are superseded in their functions by the new tubes annually formed within, and become dry and hardened, they are useful no longer, either as channels or as a covering.

That old hardened bark is useless as a protective covering, may be inferred from the circumstance that the first shoot from the seed, and all young shoots subsequently produced by the tree, have only one cuticle and epidermis, both very thin; and yet the internal organisation is not hurt by cold air or other change of weather. And it appears from what has occurred by accident, or proved by experience, that two, or at most three, of the latest-formed layers of liber left on the alburnum (the last-formed layer of wood) is amply sufficient to carry on the processes of growth, and even with increased vigour. This (without trusting to the reports of the amateur decorticators) is very apparent, if we examine any part of a stem which has been previously wounded and afterwards healed over. The scar is always more protuberant than the sound part, showing plainly that the living membrane found relief by the removal of the old coat of bark. The same effect may be observed on the wounds made by silly persons carving their initials or names on the smooth bark of healthy trees; the cicatrices are not only filled up, but become protuberant, and remain visibly so for many years afterward.

A very striking instance of the advantage of decortication of even healthy trees, once came under the writer's notice, which he may be excused for relating; it was as follows:—

Two fine young beech trees, standing near together, and forming a fine feature from the breakfast-room windows of a mansion, were both, and cleverly, circumcised, and deprived of perfect rings of bark by mischievous boys, to make baskets to hold wild strawberries, then beginning to ripen in the woods. The wounds were full six inches in length, so that perfect cylinders of that dimension were extracted. The scars were conspicuously visible at a considerable distance, and to the eyes of those who owned and valued the trees, and who considered the wounds as mortal. Although this happened on a Sunday morning, the trees were put immediately under the surgical care of the gardener, who applied a thick plaster of grafting-clay, binding it on with canvass, and fenced the trees from cattle. In two years the wounds were completely healed over; and in two years more were, and *continue to this day to*

every plant being visible to the eye of the visiter, and every pot visible to and within reach of the manager. This disposition is necessary as well for viewing the flowers and foliage, as for giving water to all or any one when requisite.

No rule for watering can be given as to the time when the watering-pot should be used ; this depends on the season of the year, but much more frequently on the habit and state of growth. In winter, potted plants require much less water than in summer ; and those growing freely, whether in summer or winter, invariably require more frequent watering than such as are torpid or stationary in growth ; and this applies to all plants, whether herbaceous, or shrubby, or succulent. Indiscriminate watering is very seldom judicious, except, perhaps, at midsummer, when exposed to the open air, and when the whole collection is in rapid growth. The appearance and position of the leaves, and those of the soil in the pot, indicate most truly when water should be given. While in the house, the best time for watering is between nine and twelve o'clock in the forenoon, because any moisture which might be injurious during the night, is dried up during the afternoon. When the plants are out, they require water every day in dry weather ; and this should be given late in the afternoon, in order that they may be thoroughly refreshed during the night, and be the better able to bear the heat of the following day.

Greenhouse plants of dangling growth at all times require to be neatly tied to stiff green-painted sticks, placed as close as may be to the principal stem ; both sticks and ties as much concealed as possible : and when the surface of the pots become covered with moss, it should be removed, and a little fresh compost added. Decayed flowers and leaves should also be frequently removed.

Shifting the collection is annually performed, most of the plants requiring removal from small to larger pots. This is particularly necessary for heaths, and all similar-rooting plants ; but it should be observed that the new pot should be but a very little larger than the old one, because nothing hurts a plant so much as over-potting it, for the extra soil either becomes sodden and unwholesome for the roots, or, if it remains sweet, it encourages stronger growth than is desirable for the house. When a plant is turned out of its pot, the roots are found to be in a matted state round the side. If of very delicate structure, like those of heaths, they should be left entire, and without being much disturbed ; but if of stronger growth, such as those of geraniums, or other rank-growing plants, the ball may be loosened a little, to admit the fresh compost among the outer roots, and perhaps it may be replaced in the same-sized pot. All plants, especially those

having a scanty system of roots, are better placed in small than in large pots ; and such as are in an unthrifty condition, are often recovered by a removal from a large to a smaller pot.

The usual time for shifting is either just before or at the time of taking the plants out of the house in the month of May ; or the general shifting may be done a week or two before they are brought into the house in September. Either season will do ; but it a good plan to keep an eye upon the choicest sorts, and shift them whenever they appear to need more room. This renders the business of either taking out or putting in the plants a much more expeditious affair than when the whole collection is to be shifted at once.

The proper compost for the generality of greenhouse plants is a mixture of moor-earth and light loam. The former is that where heath naturally grows, and should be collected surface turf and all ; and it only requires to be chopped in pieces by the spade before it is mixed with the loam. On no account should it be sifted, as the looser it is, and the fuller of roots and nodules of turf, the better the plants thrive. Sifted compost is liable to become too compact, and, if once it gets dry, absorbs water too slowly to be beneficial. Heaths require entire moor-earth, as well as all the tribe called American plants ; indeed it is very much used as well for stove as greenhouse plants, its natural poverty inducing that moderate habit of growth which is so suitable for the confined spaces allowed to such collections. Some plants, as camellia, require equal parts of sandy loam and moor-earth ; others loam, with a small portion of decomposed dung, when the purpose is to make them grow strongly. Geraniums are sometimes, and orange-trees are always treated with manured compost ; but for plants in general, moor-earth and loam mixed in various proportions ; and if the loam be heavy, some pure white sand is added, to make the whole more friable, will be the most eligible mixture.

Pruning or cutting, in the over-large or irregular growths of the plants, is sometimes necessary ; but this should always be done in the spring, in order to allow them to become bushy before the following winter.

Greenhouse plants are propagated by seed, cuttings, layers, or by grafting. Seeds should be sowed early in spring, in wide pots or pans, and kept near the glass in the greenhouse, or in a frame. In rising, the seedlings require to be kept in a very uniform temperature, and neither too wet, which would rot them, nor too dry, lest they be withered ; and as soon as they are of sufficient size, they must be put singly into the smallest pots, and forwarded under glass, till they are fit to take their place in the collection.

Propagating by cuttings is an easy and generally successful practice. Some share of practical skill is required in making choice of the cuttings, because some strike roots best when the shoots are young and tender, and others will not strike at all while young and succulent. Heaths belong to the first description, and camellias to the second ; the latter can only succeed, as cuttings, when the young shoots have ceased growth, and have acquired a somewhat firm woody consistence. There are also some plants whose cuttings must be only what the old gardener calls "half-ripened," that is, neither succulent nor woody, in which state they strike roots most readily ; the genus *Clethra* is one of this description. A great majority of greenhouse plants, however, readily strike root by cuttings, without regard being had to these punctilios, provided the cuttings are properly prepared, planted in sand, and placed in hotbed heat under a striking-glass. Cuttings of the roots will sometimes succeed when no proper shoots of the top can be had.

Propagating greenhouse plants by layers is sometimes had recourse to with favourite kinds, which do not root from cuttings nor succeed by grafting. This is by layering some of the shoots of the head into pots of proper soil raised on a stage round the plant. The base of the shoot is hooked down on the surface of the soil in which the layer is to be struck ; the point of the shoot is raised with one hand, and held towards the stem of the mother plant ; with a keen pen-knife in the other, a thin slice or tongue of the bark and wood is severed, but not cut off from the shoot, and this wounded part is laid on a little furrow made to receive it, embedded in white sand, and afterwards covered with about half an inch of earth, keeping the extremity raised in the air. New fibres are produced from the incision, and when these have taken sufficient hold of the soil, the layer is separated from the parent.

Greenhouse plants may be propagated by grafting. This operation is chiefly performed on orange-trees, camellias, &c., and usually for increasing the best varieties, by placing them on stocks of the common or single sorts. The mode of grafting is that called *inarching* ; that is, the young stock is placed near to the sort sought to be increased ; a shoot of the latter is brought to touch some smooth part of the stem of the former ; a slice of the bark of each at the point of contact is cut away, and the two wounds are closed together, and there made fast by a ligature of matting, and clayed. When a union has taken place, the top of the stock is cut off, and also the base of the graft, leaving the top of the latter upon its new stem. Plants are also increased by division of the root, and sometimes by suckers.

I have noticed these different modes of propagation in this place,



because, as I shall probably have occasion to allude to them in my future letters, they will not then need to be repeated.

Respecting the greenhouse there remains to add, that it is so constructed as to admit of perfect ventilation, and that it is encircled by a gravel-walk, leading from the south side of the basin round to the north side of the same. Between this walk and the base of the building, on the west end and south side, there are borders filled with Cape bulbs, &c., the north side, where the stock-hole is, being hidden by a thick screen of evergreen shrubs.

Notwithstanding this greenhouse is on a small scale, it is perfectly suitable for the well-chosen collection which it contains. The stage covers an area of two hundred and thirty-four square feet, exclusive of the shelves along the back-wall front and ends of the house. This space is capable of containing one or two plants of all the more curious or beautiful exotics usually met with in greenhouses; and out of above eleven hundred genera ranked as greenhouse plants, two-thirds have neither beauty nor rarity to recommend them; their absence, therefore, is not regretted in such a house as this.

The next object I have to mention is the ranunculus bed, which, I understand, is managed as follows:—the bottom is always trenched over pretty deeply in the month of September, and about one foot of the surface removed; over the bottom of this opening about three or four inches of rich moist dung is laid, and made level. This is for the purpose of forming a reservoir of moisture, whence a stream of nutritious vapour will be ever rising during the growth, whether the fibres ever reach the dung or not. Upon this a coat of fresh maiden loam, of a light and rather sandy quality, is laid to the full height, the surface being rounded. Thus prepared, the bed remains to settle till about the first of November, when the roots are planted in shallow drills made lengthways of the bed, five inches apart, and placing the roots at about the same distance from each other, covering them about two inches deep. The bed, being thus finished, requires no further care till very hard frost sets in. In this case, some slight covering is necessary; and as the plants very soon suffer if deprived of fresh air, a covering of common or reed mats is supported over the bed by a light frame of rods, bearing the mats on the top only, about a foot or so from the ground, and open at the sides and ends to permit a free current of air. The mats are not kept on constantly, but rolled off or on as the weather renders necessary.

If the winds of March parch and loosen the surface of the bed, the earth should be pressed firmly together among the plants; and if the bed gets very dry, it may occasionally receive a soaking of manured

water, if the night be not too frosty. When in flower, the bed is shaded in the middle of the day, to preserve the beauty of the bloom as long as possible; and when the flowering is over, and the foliage has died down, the roots are taken up, cleaned, dried, and put away in drawers till next planting season. It has happened that the roots have not been planted till January, and then there was a very good bloom, but not quite so strong as if planted at the end of October, or the beginning of November; neither were the roots so strong when taken up. The advantage of autumn planting is manifest, provided the plants are protected through the winter unhurt.

The hyacinth bed is the next in order, and is particularly well fitted up for the cultivation of a valuable, numerous, and named collection of the best Dutch bulbs. The bed is boarded all round nearly three feet high, is surrounded by a gravel walk, which falls into the leading walk, which ranges along one side at each end. As before mentioned, an awning is erected during the flowering season, which includes the walks as well as the bed, with drop-curtains at the ends and west side, to be lowered and raised at pleasure. The bed is prepared somewhat in the same way as that for ranunculuses, only the surface soil for the roots is composed with a considerable proportion of sharp sand.

The bed is four feet wide, and holds four rows of bulbs lengthways, at eight inches apart every way. In the last week of October, holes for the bulbs are first made with a blunt dibber; these holes are half-filled with white sand, on which the bulbs are seated, and covered over with the same. This is for the purpose of keeping the bulbs sound, and free from too much moisture before they are in action. The bed is now made up with a surface coat of the compost, about two inches thick, over the bulbs.

If the frost be very severe about the time the points of the leaves are peeping out of the ground, about an inch of old decayed tanners' bark, or rotten hotbed dung, is laid equally over the bed. This prevents frost penetrating to the roots, and also tends to keep the bed cool, if a dry spring follows. In the depth of winter, hoops are put over the bed to support mats or canvass, to keep off snow or hail-storms happening at that season; but such coverings are only kept on for a short time, and are but seldom used.

As soon as the flowers begin to show colour, the frame for the awning is put up; and this is put over as soon as the flowers are sufficiently advanced to be in danger of being hurt by the sun. Next, propping-sticks and ties of green worsted are prepared for supporting the flowers in due position. Hyacinths continue in beauty for about three weeks,

and as soon as this is over the awning is immediately removed, in order that the plants may enjoy full air and light, which they very much require after being so long shaded.

When the stems and leaves become yellow and withered, which usually happens in about a month after the bloom, the bulbs are taken up and laid on the surface of the bed, each in its own place, and lightly covered with sand or part of the compost. This is called ripening the bulbs, which is accomplished in about three weeks, when they are taken up singly and trimmed of the remains of the stem and leaves, which are cut off close, and freed from loose skins, fibres, and the largest offsets, and then all stored away together in drawers kept in a dry room.

After passing the basin we arrive at the tulip bed. This is prepared by stirring the bottom deeply, and forming a surface layer fourteen inches deep of three parts rich mellow loam, one part fine leaf mould, one part perfectly rotten dung, and half a part of pure sand. This compost is rich and porous, properties necessary for the tulip. All this preparation of the bed is done previous to the first of November; and after being thoroughly settled and laid, rounding two inches higher in the middle than at the sides, the bulbs are put in about the eighth of the month. The bed is four feet wide, which holds seven rows of bulbs, with seven-inch intervals between, and the bulbs are also seven inches apart in the rows. They are placed in sand, as practised with hyacinths, and let in full three inches deep.

In planting the bulbs, the tallest growing varieties are placed in the centre row or rows, and the dwarf-growing kinds at the sides.

This bed is treated in all respects like that for hyacinths, already described, as to defending against hail-storms, and particularly after the bloom-buds appear among the leaves, erecting the awning, &c. Tulips also require to be supported when in bloom. This is done by fixing green-coloured lines along each row, from end to end of the bed. To these lines the stems are tied with worsted, such as is mentioned for hyacinths.

When the beauty of the flowers is over, and the greater number have lost their petals, the awning is removed, and the hoops replaced, to allow of occasional covering against excessive rain. All the seed-vessels are cut off, because, as seeds are not wanted, allowing them to ripen only exhausts the bulbs to no purpose. When the stem is so far withered as to present a purple colour, it is a sign that connection with the bulb is cut off, and therefore the bulbs themselves may be taken up, dried, and stored. During the time the stem and leaves are decaying,

(about three weeks or a month,) the bed should be kept rather dry than otherwise, and this to prepare the bulbs to enter on their summer rest.

The next bed to be noticed is that appropriated to anemones ; but the management of this is so similar in every respect to that detailed of the ranunculus, that nothing further need be added as particularly applicable to the anemone. The tubers are planted in the last week of October—are defended from severe frost in winter—are watered, if necessary, before, and shaded when in flower. After flowering, and when the foliage is dying off, the bed is kept dry ; and about a month after the bloom, the tubers are taken up and stored.

Besides these beds, many of the same kinds of bulbs and tubers, as well as polyanthus and narcissus, are planted in pots for going into the greenhouse, and in patches in different parts of the flower-garden and other spots of the pleasure-ground. A collection of choice auriculas is also kept in pots, and generally occupies the shelves under the shelter of the ivied trellis before mentioned.

The foregoing memorandums of practical floriculture, which I have picked up from time to time, may not, perhaps, be very interesting to you ; but wishing you to share with me in every thing which now so entirely engrosses my attention, and which, moreover, makes up a principal part of my daily gratification, I could do no less than note them down for your information.

My pen has given but a very faint idea of the principal features of the flower-garden ; indeed, without the aid of a faithful pencil, it is impossible to convey any just impression of the bland and varied beauties of this interesting spot. But let us leave it for other scenes. The left-hand branch of the leading walk, passing by the flower-beds we have just been noticing, leads to the end of a finely secluded and shady walk between two ranks of lime-trees (*Tilia Europæa*), planted about thirty feet apart, and whose arms are intermingled over head. They form a short avenue, terminated by an ornamented trellis, forming an alcove over a seat. The trees stand upon mossy turf, and their columnar boles are backed by dense masses of evergreen trees and shrubs, which, while they render the walk perfectly secluded, add a pleasing kind of quiet stillness, particularly suited to the contemplative mind. As a summer-walk, when the heat of the sun is oppressive, this must be delightful ; and as a contrast to the cheerful brightness of the flower-garden, nothing can be more pleasing, as affording repose to the eye as well as the mind. If this avenue were longer, it would, be less pleasing ; but its disposition being the prototype, it has all the air and grandeur of the middle aisle of a cathedral, and all that imposing kind

of effect arising from the elevated canopy sustained by and springing from the two ranks of stately trunks.

This avenue would be imperfect, had it no ostensible termination ; but this is avoided by the erection of trellis-work already alluded to. Nor is it a useless ornament ; it contains a sofa-like seat and a table ; and at each end, in semicircular niches, are placed a pair of Etruscan vases on pedestals ; and on the top, three smaller ornaments of the same kind. From the upper end, a narrow walk branches off at right angles into the pleasure-ground. When this avenue is used as an approach to the flower-garden, the sudden burst into the latter is a transition of the most pleasing nature, in consequence of the stronger light and variety of objects which at once strike the eye.

Before leaving this avenue, I may as well advert to the subject of avenues generally, as an old, though now a neglected feature of park and garden scenery. In ancient times an avenue was an indispensable, and very often the only mark of ornamental planting visible about a palace or other building of note. In warm countries, avenues were particularly necessary for the shade they afforded, and therefore were planted in all places of public resort in cities, particularly those which were fortified, as appears on the boulevards of such places at the present day. The northern nations imitated the gardens of Italy, and all ecclesiastical establishments, founded by the bulls, and under the authority of the then head of the church, in the colder countries, received this embellishment. Royal palaces, the gardens of colleges in universities, episcopal palaces, noblemen's and gentlemen's country seats, all had their avenues sometimes a mile or two in length. At the reformation of English gardening, the avenue, from its right-lined formality, was one of the first objects on which the reformers laid violent hands. A sweeping sentence of condemnation was passed against them in all places, being private property, which were intended to be made beautiful. On these sad slaughter was made, and avenues were banished from every place, except royal palaces and public gardens, to which they are particularly appropriate ; for wherever solemn or majestic grandeur was sought to be impressed, no other disposition of trees is half so effective as either close double avenues, or wide, open, right-lined glades of the greatest possible length. There is an imposing dignity about an avenue which cannot be produced, as already said, by any other disposition of trees ; and the sons of those forefathers who, a century back, possessed fine avenues, have now to regret that they were so rashly thrown down.

It is perfectly true that a very long avenue becomes tedious ; because, seeing the whole at once, from end to end, and the impression of every

progressive step being the same, attended with a feeling of confinement, the mind instinctively labours to get free, by "swallowing up the space between" to reach the end; but a short avenue, leading to a principal or garden entrance of a princely mansion, has a good effect, as its regularity and exact order are a kind of anticipation of that regularity of the structure you are about to enter.

When the slaughter of avenues was the rage in this country, the public voice was raised in their behalf. "Cannot a chief part of the trees be saved, and grouped, by a partial clearance?" was the cry. Philo-arborists, the admirers of straight lines, and lovers of shade, and even a very popular poet, endeavoured, in the most plaintive terms, to avert the doom declared against them. Artists were found to attempt this. Mr. Repton, perhaps, was the most successful, who, by breaking the lines irregularly, and planting behind and before the groups, rendered these irregular both as to size and outline; but he could not make the striplings associate with the old denizens of the avenue; nor will the wished disorder be complete, until the young trees have attained their natural altitude. But in connection with this attempt to destroy the regularity of the avenue, was the expedient of removing the approach from between the ranks of trees, and carrying it so as that the passenger should not directly enfilade the old line of avenue; for, viewing it from either end, or from not very distant collateral points, "the ghost of the old avenue" would be as striking as ever.

However such attempts may have been executed, or however they may have succeeded, much merit is due to the man who has endeavoured or endeavours to save the life of an old tree. Its principal value, perhaps, consists in its having been planted by a venerated hand, at a far distant date, or because it occupies a particular spot, and no other. Its value as timber may be very little indeed, and therefore avarice need not sign its doom. And yet, with regret be it stated, that both poverty and avarice were auxiliaries in the demolition of avenues; while, at the same time, selfishness for thriving trees, and an ardent, though blind love of them of any age, were proof against the prevailing taste of those days; and the consequence has been the preservation of most of the avenues about private residences which are yet to be seen in this country. I may repeat that, in a general consideration of avenues as an ingredient in landscape gardening, they are only applicable to regal or other palaces, or wherever magnificence, solemn dignity, or lofty grandeur, are intended to prevail;—an avenue to a cottage is ridiculous.

But to return to the avenue which has led me into this long digression, I have to remark, that it does not seem to be a part of an old or

longer one, or that it has ever been used as an approach to the house; but, as far as I can learn, was planted for the express purpose of a shady walk and place of retirement, and also to form a distinct feature, and thereby add to the other interesting disposition of the pleasure-ground.

Yours truly,

A. B.

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NOTICES OF BOTANICAL PUBLICATIONS.

EDWARDS'S BOTANICAL REGISTER, continued by Dr. Lindley. October, 1st, 1835.

1. *Coryanthes maculata*. Spotted Coryanthes. A splendid orchideous plant, and one of the most curious, in the distorted shape of its sepals and petals, of the whole order. "It is a native of the woods of Demerara, where it is not uncommonly found, hanging from the branches of trees, and suspending in the air the singular lips of its flowers, like fairy buckets filled with honey, distilled into them from two horns fixed over them, and attached to the base of the column."

This species of *epiphyte orchis* has, like many of the others, what are called pseudo-bulbs, and the flower-stem rises from the crown of the roots, and hangs downwards, which the situation of the plant on the stem or branch of a tree so freely allows, and which could not take place did the plant grow on the surface of the ground. This circumstance shows the wonderful provision of nature in adapting a plant to its most favourable station, or the station to the plant. Flower-stems, in a great majority of plants, grow upright, and are produced from some exposed member of the system. Many of the *Orchideæ*, on the contrary, produce their flower-spike from among the roots, and have a tendency to grow downwards, not from laxity of fibre, or weight of the flower, but from, as it would appear, aversion to sunshine; indeed so decidedly is the downward growth exhibited in some of them, that, when confined by being planted too deep in a pot of turfy soil, the flower-stem will force itself downward through the soil, and escape at the hole in the bottom, or otherwise, as is often the case, remain unexpanded, to rot unseen. It is for this reason that the best cultivators of these interesting plants place them on the top of a cone of proper compost, high above the rim of the pot, by which means the flower-stems have a chance of protruding through the sides of the cone, and showing their beauty in the air.

This plant differs from the *C. speciosa* and the *C. macrantha*, which has lately flowered at Mr. Knight's exotic nursery, Chelsea,

and is said "to surpass both in the richness and magnitude of its flower."

2. *Ipomœa Aitoni*. Mr. Aiton's *Ipomœa*. "A pretty stove climber, not uncommon in collections, under the name we have adopted." The leaves are lobed, resembling those of ivy, and the flowers are pale purple.

3. *Govenia superba*. Superb *Govenia*. A handsome orchideous plant, named by Dr. Lindley, in honour of J. R. Gowen, Esq., of Highclere, the seat of Earl Carnarvon. This is a Mexican species, and is one of the most stately of the order, "growing to the height of a man in Messrs. Loddiges' collection." The general colour of the numerous flowers is yellow, tinged internally with pale rose or purple. "It is found to bear the hottest and dampest stove; but, like all the terrestrial species, requires a season of repose."

4. *Mimulus luteus*; var. *variegatus*. Variegated Monkey-flower. One of the most showy yet seen in our gardens, and as easily propagated as the other sorts.

5. *Pleurothallis Grobyi*. The Groby *Pleurothallis*. A very small genus, belonging to the *Orchideæ*. The flowers and foliage are minute and very delicate; it thrives only in a damp atmosphere.

6. *Edwardsia Chilensis*. Chilian Mayu-tree. A handsome hardy tree, flowering in May. It was introduced by Messrs. Loddiges in 1822, in whose collection it is only yet to be met with. Its hardiness makes it a most desirable acquisition to the ornamental planter.

7. *Maxillaria crocea*. Saffron-coloured *Maxillaria*. This is another curious, though not a very showy South American Orchis. "Like most of the terrestrial *Orchideæ* from tropical countries, it requires the constant heat of the stove, and to be kept rather moist."

8. *Stanhopea oculata*. Eyed *Stanhopea*. Another most remarkably curious and grotesque-flowering orchideous plant, introduced by Messrs. Loddiges, and by them called *Ceratophilus oculatus*, but renamed by Dr. Lindley in his *Gen. et Spec. Orch.* The flowers of this natural order are so various in form and colouring, that it is difficult to find terms to convey by the pen (even by the use of the most precise botanical glossology) a faithful description of them. So much is this difficulty met in describing the flowers of the present plant, that Dr. Lindley states, that the singular form of the labellum "has rendered it necessary to distinguish it into three parts, for the convenience of description. The lowest part of the lip is the *hypochilium*; the upper end is the *epichilium*; and the intermediate portion, the *mesochilium*. All these parts are, however, nothing more than the divisions in a very fleshy lip, produced by contractions of its sides, and by the lobes, so



common in the order, variously arranged and combined. The species is at once known by the narrowness and length of the *hypochilium*, independently of all other circumstances."

We may add that the flowers are large; general ground-colour yellow, besprinkled thickly with deep purple spots.

9. *Prunus japonica*. The single Chinese Plum. "It is always interesting," says Dr. Lindley, "to procure the wild forms of cultivated species, and to see from what humble originals nature produces some of the most striking of her works." The double Chinese plum, or almond, as it is often incorrectly called, is the handsomest plant of its season. The simple shrub now represented is its origin, and is one of the many examples of the patient industry of the Chinese in improving the wild plants of the woods into the gayest ornaments of the garden. It appears to be a hardy shrub.

10. *Maxillaria picta*. Painted Maxillaria. Another rather showy orchideous plant, introduced by the late Mrs. Arnold Harrison from Brazil. The flowers are greenish white and yellow, richly spotted with purple.

11. *Chironia peduncularis*. Long-stalked Chironia. This is sometimes called *C. trinervis*, and is a very pretty free-flowering greenhouse plant.

12. *Maxillaria densa*. Dense-flowered Maxillaria. Another orchideous plant, a native of Mexico, whence it was imported by the Messrs. Loddiges.

13. *Fuchsia discolor*. Port Famine Fuchsia. A species which seems to be somewhat different from the other species in our gardens, and supposed to be rather hardier.

14. *Fernandezia acuta*. Sharp-leaved Fernandezia. *Orchidea* again. This is one of very peculiar habit, the base of the flower-stems or branches being densely covered with pointed leaves, imbricated over each other in a double series. It requires a hot damp stove.

SWEET'S BRITISH FLOWER GARDEN, October 1st, 1835. Continued by D. Don, Esq.

1. *Nolana atriplicifolia*. Spinach-leaved Nolana. A hardy Peruvian annual. "The flowers are large, and extremely showy, being not unlike, in form, size, and colour, those of *Convolvulus tricolor*." This stranger is well worthy a place among the other annuals of the flower-garden.

2. *Rhododendron flavum*; var. *ardens*. Fiery Roseberry. A very fine rich-coloured variety, produced between the *R. flavum* and one of

the varieties of *nudiflorum*. Introduced from Holland by Mr. Knight, of Chelsea.

3. *Collinsia bicolor*. Two-coloured Collinsia. This is a handsome herbaceous annual, found in California by the lamented Douglas, and first raised in the garden of the Horticultural Society of London. It is already in the trade.

4. *Tupa blanda*. Blush-flowered Tupa. A new genus, separated from *Lobelia*. It is a hardy perennial, and has been raised in this country from Chilian seeds. It is by no means so showy as its congener, the cardinal flower; but it is a desirable associate to this and the other species of *Lobelia*.

PAXTON'S MAGAZINE OF BOTANY, October, 1835, contains—

1. *Tropæolum majus venustum*. Large-flowering, graceful Nasturtium. A new variety, introduced from Belgium, and appears to be a cross between the deep red one and the common.

2. *Maxillaria Harrisoniæ grandiflora*. Harrison's large-flowering Maxillaria. An orchideous plant, having white flowers, clouded with purple and yellow.

3. *Gladiolus pudibundus*. Modest Corn-flag. A very showy hybrid, originated between the *G. cardinalis* and *G. blanda*. Although only a hybrid, it is well worth a place in every flower-garden. It flowered at Chatsworth in the greenhouse.

4. *Schizanthus pinnatus humilis*. Dwarf wing-leaved Schizanthus. A hardy annual from Chili; differs from the common only in being a plant of lower growth.

SMITH'S FLORISTS' MAGAZINE, October, 1835, contains four plates of very beautiful plants, viz.

Dennis's Queen Adelaide and Concessum *Pelargoniums*; *Alstræmeria tricolor*; Viscountess Beresford Dahlia; and the *Tigridia Pavonia*.

Of the latter genus it is observed, that it should have been called *Leopardia*, rather than *Tigridia*, as more expressive of the spotted character of its flowers.

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#### CHARACTERS OF GARDEN INSECTS.

I THINK with J. B. G. (p. 343), that it would be of great utility to "give representations of various insects which infest fruit-trees

and vegetables." It might lead both the professional and amateur gardener to the study of entomology—a science which is so nearly connected with botany and gardening, and so necessary to be known, to distinguish *friends* from *foes*. Cuts similar to those in the "Magazine of Natural History" would do; and if as good figures were given, no one could fail to identify the insects. Unfortunately, ignorance even of the elements of entomology has been so prevalent, that it has been very much the custom to consider every insect as an enemy, and, without any inquiry into habit, to consider them all equally injurious to vegetation. Now it is quite clear, and a very little study will convince any one, that, instead of all *garden insects* being noxious, many will be found perfectly harmless, and many others really beneficial. Who would wish to banish the beautiful peacock butterfly (*Vanessa Io*); the admirable (*Vanessa Atalanta*); the tortoise-shell (*Vanessa Urtica*), &c. &c.; the various humble bees (*Bombi*); the honey and wood bees (*Apis* and *Andrena*), &c., which enliven the gaiety, and give a sort of enchantment to the parterre? All these, and many others, come under the harmless class. The beneficial class consists of the ground beetles (*Carabidæ*), the *Staphilinidæ*, *Coccinellidæ*, &c., and others which are insect destroyers. If, therefore, a short history, as well as cuts, were to be given, or at least as much as is known of their destructive, harmless, or beneficial habits, to show which should be cherished and which destroyed, and the best method of carrying both into effect, it would not only be extremely useful, but permanently valuable.

I would just notice that J. B. G. seems to consider the centipede (*Lithobius scolopendra forficata*) injurious. I do not think it is, nor any of the tribe. It will certainly be found about vegetable substances but seldom, except when decomposition has commenced; and, although some species of this genus are found about bulbs (tulips, narcissi, and hyacinths), yet I never remember finding them about sound bulbs; nor could I ever discover that they were instrumental to their decay: in fact, they are considered by entomologists as insectivorous. The millepedes (*Iulidæ*), a cognate genus, is of similar habits.

In answer to J. B. G.'s inquiry about "gummy substances," I would ask, if such substances were used, would they not be injurious to vegetation, by preventing respiration? Would not a dusting with quick lime, after a shower or watering, be more certain in its effects, and less hazardous in its consequences?

## MISCELLANEOUS INTELLIGENCE.

**GEOGRAPHY.**—Such is the importance, intimately and correctly, of a good map of the world, upon a scale as extensive as possible, that, independently altogether of the character of the earth itself considered as a whole, no one is properly qualified for acting his part well in the common business of life, and no one is capable of duly appreciating the value of history, enjoying a book of travels, or, in short, of talking like a rational being about any of those countless foreign substances which are now met with as the materials of use or ornament, or as portions of food in almost every house within these kingdoms; and though we are not advocates for any morbid excess of legislation upon any of those points in the domestic conduct and economy of the people, which do not trench in anywise upon morality and orderly and becoming behaviour, yet it would be no bad rule to set the stigma of the neighbourhood upon every person who presumes to use any one of these articles without being able to tell whence it comes, what are the general characteristics of its native country, how it is grown or otherwise obtained, or how it is fetched to this country, and what advantage there is in using it,—whether as a means of innocent enjoyment, or as a stimulus to our industry at home.

If folks could once be led to this, it is incalculable to conceive how much more delightful it would make the world we live in, because it would enable us to live mentally, and in our mental life consists our real enjoyment in all the world at once. Thus, for instance, we should be enabled to drink our coffee in the groves of Yemen, with turbaned Arabs and loaded camels around us; and under that balmy sky we could look athwart the Red Sea, which is there in one place an assemblage of worm-built reefs, extending line upon line, and white with the foam produced by an angry wind, and in another place reeking with the steam of volcanic fires, while the bottom is as gay as a garden with the vegetation of the deep, and the waters are literally encumbered with living creatures. So might we drink our tea in some fantastic alcove in the pleasure grounds of a Chinese mandarin, and enjoy the characters of that most singular country, which has remained changeless for hundreds of years, amid all the vicissitudes, reverses, and progressions of our part of the world. We should never taste the stimulating flavour of cinnamon, without being borne in thought to Ceylon, with its rich fields of rice, its beautiful copses, which furnish this wholesome and exhilarating spice; its tangled and swampy woods, with their herds of gigantic elephants; its more dry and inland forests, peopled with

countless thousands of apes, which make the early morn literally hideous with their cries, and the females of some of which may be occasionally found descending to the brook in order to wash the faces of their little ones. So, also, we should never taste a clove or a nutmeg without being wafted to the spicy islands of the oriental Archipelago, where all is in the vigour of growth and beauty, and the richness of perfume; where perpetual health is wafted on the gentle gales of the widest ocean of the globe; where some of the fruits combine the qualities of their own tribe with the substantial nourishment of delicate animal food, and the admixture of a cooling ice and a cheering cordial; while the trees around us would be thronged with the loveliest of birds, and the birds of Paradise, with their long and filmy feathers streaming in every direction through the air like meteors—meteors which shine but do no harm.

But we must stop, for there is no end of the catalogue, and it is an exhibition of which we must not see too much at a passing glance. We have mentioned these few particulars merely to let those who are yet in ignorance of the subject know how well the world is worth our studying; how richly the earth which we inhabit has been endowed by its bountiful maker; how full the feast which it affords to all; and yet how varied, how free from surfeiting, how healthful.—*Mudie's Earth.*

MODERN IMPROVEMENTS OF GARDENING.—Like all other arts that of gardening has advanced wonderfully during the last threescore years. Before the commencement of that period, there were but comparatively few shining lights among the great body of practical men. Philip Miller was during his whole life “the prince of gardeners;” his writings became a code of horticulture, and his dictionary was the text-book as well of his cotemporaries, as to many of his posterity. As an authority he had no rival, although it is pretty well known that he was beholden to many of his brother nurserymen and practical gardeners for many of the most valuable parts of his book. Miller was, in fact, more of a botanist than a gardener; his situation, as secretary to the first gardening society established in London, and afterwards curator of the Apothecaries’ Botanic Garden at Chelsea, gave him fine opportunities to become acquainted with plants, and with the then system of botany as taught in the writings of Tournefort and Ray. A wrathful and disappointed man he was, when the celebrated and learned Linné promulgated his sexual system, which so soon superseded that of Tournefort. “What!” said he, “is a boy from the obscure university of Upsal come amongst us to upset the systems of older and wiser men? is a Swedish stripling to be allowed to pluck the laurels from the brows of such eminent men as our own Grew and Ray, and all the

other botanical writers of the continent? No; I, for one, shall not easily surrender what I have studied from my youth up." And so doggedly sincere was Miller in his opposition to the new system, that it is said he could not behave with common civility to its ingenious author, when he visited the Chelsea garden. Miller, however, had no competitor in his own time, and was always considered a first-rate authority on everything relative to gardening; his advice, whether oral or written, formed the character of many of his pupils, as well as of those who studied the principles and rules set forth in his dictionary.

Aiton, Forsyth, Hitt, Speechly, and several others, were eminent *off-shots* from the Millerian school in England. These were closely followed by a crop of intelligent *suckers*, as Learmont, Livingstone, Maur, Kyle, Macnaughten, Nicol, and many others in Scotland and Ireland. These became distinguished leaders, and as several of them were also writers, their improve practices were soon widely diffused; and as at that time the business was very much encouraged by the nobility and gentry of the land, gardening advanced with rapid strides.

The preceptal rules and practical examples of these horticultural *Gamaliels* were quickly disseminated among the numerous class of young men who were initiated under them; and what with close application and love of their business, precocious adepts sprung up with a few years of labour and study, possessed of as large a stock of practical knowledge as before that time required a long life of experience to attain. Many individuals, who were the pupils of the above named eminent men, lately filled, or continue to fill, the first situations in Britain, and to them, as well as their teachers, may be attributed the late and present improvements in the business.

Nor are the facilities for the qualification of young gardeners fallen off, but rather increased. The numerous periodicals and other publications on the subject have certainly very much advanced the profession, as well as the intellectual accomplishments of a great majority of its professors. All, or at least a great part, of the best practices are detailed in those publications, so that the simplest tyro, if he can but read, becomes very early in life a man of science. Often may these youngsters be heard, in the dusty region of a stock-hole, or in the gloom of a back-shed, expatiating on the mysteries of vegetable phenomena, or on the most occult points of vegetable development, and with a volubility and correctness which even the great Miller himself, were he alive, would be delighted to hear. And what is more, there is scarcely a stripling among them who, if asked, could not readily write, by the faint glimmer of a farthing rush-light, a dissertation on any point of practice, or on any branch of horticultural knowledge.

Truly "the school-master is abroad," and such is the diffusion of knowledge obtainable from the verbal admonition and practice of the preceptors, and the monthly reports of periodicals together, that ignorance is no longer a weed in a garden, nor need the culture of its crops ever be again entrusted to the management of a greenhorn.

All this is very creditable to the present race of young gardeners. They have advantages which their fathers had not; the latter had experience for their teacher; they got their stock of knowledge by morsels, collected through many a toilsome year: the former grasps the whole at once, or in the course of a very short apprenticeship.

This prompt seizure of the business is now-a-days quite practicable; it is a capture which may be made with but little exertion, and with but a small sacrifice of time. The apprentice at the conclusion of his three years' study comes forth a full-grown master, and under the influence of youthful ardour, is often apt to wonder why it is said that *long experience only* can make a perfect gardener.

Such is the promptitude with which a knowledge of gardening may now be acquired, that placing this circumstance in one scale, and long experience on the other scale of a balance, a looker-on would probably observe so many vacillations of the beam, that he would be exceedingly puzzled to say whether the *radiant youth* or the *hoary sage* preponderated. Persons at a distance from this trial scene, and ignorant of the real circumstances of the case, will very naturally be inclined, however, to prefer and trust the judgment of the old practitioner, merely on the abstract principle that the oldest must necessarily be the wisest, and particularly because the veteran is constitutionally exempt from those impetuous impulses and undeliberated conclusions to which the elastic mind of youth is, or at least used to be (we speak from experience), sometimes subject.

The fact is, that the objects of a gardener's care are affected by so many *invisible* agents, that it behoves every one, old as well as young, to be always invested with that graceful garb of rational diffidence which is so becoming even to grey hairs.

But to proceed. Gardening has, within the time specified, been improved by the accession of new culinary vegetables, new practices in their culture, additions to our catalogues of fruit, and improved modes of bringing them to perfection, whether native or exotic. The business has also been facilitated by clearer views of the organography and physiology of plants, and which has provided the cultivator with powers to which he was heretofore a stranger. New facilities have been given by the late improvements made in horticultural buildings, and in the heating apparatus employed in them. All which has given the modern

very great advantages over the ancient horticulturist, and which will fully appear by treating of the above particulars in their order.—ED.

(*To be continued.*)

ON THE POTATO.—Great complaints have of late been made of the crops of potatoes in many parts of the kingdom, and it is said by many the crops are not generally so good as they used to be. This in many cases is not surprising; if the growers of this valuable root will not be careful to have good seed, they must not expect a good crop. How careful, generally speaking, is the farmer to procure good seed for his crops; how particular the florist in having the most perfect seeds and plants he can procure: but with the potato, one of the most valuable vegetables in the universe, not one in six is sufficiently careful in procuring good seed. How often we see, in a flat of potatoes, some spring up with two or three weakly shoots, which soon die down and produce no tubers; in another part of the same flat no tops at all are produced. There can be no doubt this is owing to a deficiency in the seed, being in that exhausted state it cannot support the top, and in some instances cannot produce one at all, though if the potato be dug up it will be found to have made an effort to do so. It is a very common practice, but a very bad one, to take little or no notice of seed potatoes until just before they are wanted; then to go to the pit or heap where they have lain all winter (*or to the market*), and take out what are wanted. Now, in three cases out of four, it is certain these cannot be fit for seed, for in a pit or heap it is impossible for the powers of the potato to be at rest; any one who has used his eyes would perceive how the potato has been exhausting itself by putting out numerous shoots, frequently many inches long. These are generally so tender, they break off immediately, another effort has then to be made when planted to produce others; this of course must make against the crop, for how is it possible to have a good crop when the productive powers of the seed are injured or decayed? This is not the worst, for they are often laid up again to produce other shoots before planting, which are so tender they are not unfrequently broken off a second time. Allow me to suggest a few directions with regard to the seed and planting of this most valuable root. In the first place, I should advise every one to save their own seed. When the first crop of early ones are ready, throw out upon the bed as many middle-sized ones as are likely to be wanted for next year's seed; there let them lie till autumn, by which time they will have become a green colour. Let them then be taken up and laid by for the winter in a cool dry place, protected from frost but not put in a heap. Previous to setting them, bring them out and expose them to the air for ten days or a fortnight; then let them be set whole.



As you cannot give your late potatoes the same exposure to the sun previous to laying up for the winter, bring them out as soon as you can in the spring, and let them be exposed to the sun till the time of planting. I particularly recommend every one to sow their own seed, as they cannot tell what they are buying if they go to market for them. I shall be glad at a future time to say more upon this subject.

Wirksworth, Derbyshire, Oct. 17, 1835.

G. T. DALE.

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## CALENDARIAL MEMORANDA FOR NOVEMBER.

### KITCHEN GARDEN.

*Cauliflower.* The young plants intended for next year's service should be by this time in their winter quarters, and where they may be occasionally defended from frost. The Michaelmas crop is now yielding heads, and the forwardest will require attention lest they be unexpectedly caught by a night frost. They should not be trusted in the open air after the twentieth of the month, unless the weather be very favourable indeed.

*Peas.* Sow a second crop of early peas, of the kinds and in the manner recommended last month; it is also a good time to sow in pots, if any are intended to be so raised. See that mice or jays do not visit the first sowings; slugs are also to be guarded against, which, if the soil be not very compact, will devour the plants underground.

*Beans.* Put in a succession crop of mazagan beans, and protect the former sowing as is advised for peas.

*Cabbage.* Another piece of cabbage may now be planted, if enough have not already been put out. A single row of red cabbage may also now be planted, to come in early next summer for pickling.

*Spinach* should be kept free from weeds, and properly thinned.

*Broccoli.* The Cape sorts are now in use. Exposed heads may require similar care to that bestowed on Michaelmas cauliflowers.

*Celery* should be now finally earthed up, not only to blanch but to defend it from winter's frost and rain.

*Endive.* Full-sized plants in the open ground may be blanched on the spot, if the weather be favourable, or removed into beds of dry sand, where they may be blanched in safety.

*Lettuce.* Seedlings in frames, intended for transplanting in January, should now be partially thinned, to allow each plant to become stocky; when they are suffered to stand too closely in frames, they are liable to be too much drawn and tender.

*Asparagus.* The beds should now, if not done before, receive their winter dressing, by laying a coat of old hot-bed dung, two or three inches thick, over, and covering this with a little mould dug from the alleys. This covering nourishes the roots, and when decomposed enriches the ground when it comes to be forked up together.

*Artichokes* must also be secured from frost by a thick covering of litter over the place occupied by the roots, and this covered with earth, laid like a ridge along the rank of plants to keep the roots dry.

*Sea Kale.* The beds of this vegetable should receive a fresh coat of sand, if necessary, and a thick covering of dry leaves or litter, as well to repel frost as to encourage early growth. If any be intended for forcing, either in the open ground by linings of hot dung, or in pots to go into a forcing-house, it is now time to begin, especially if wanted for Christmas.

*Mushrooms.* The bed or beds made in September will now begin to bear. Particular attention will be required to maintain a uniform degree of heat in the bed, and this can only be regulated by the quantity of the covering employed. If the surface has become very dry and loose, a good sprinkling of tepid water may be of service.

**FRUIT GARDEN.**—Removing old worn-out fruit trees and planting young ones is one of the operations of the gardener in this month, and the sooner it is done the better. Pruning of all fruit trees, except peaches and nectarines, may now be performed, in order that the nailing may be done in the course of the winter. If the bearing wood of peaches and nectarines be fully ripened, it should now be unnailed, to remain so till pruning time in March, and this for the purpose of delaying the expansion of the flowers, which are very apt to be too early excited by being laid close to the wall in the earlier months of the year. It is the proper time for transplanting and pruning all the small fruit trees,—as gooseberries, currants, and raspberries,—which, when done at this time, allows the ground among them to be dug and laid in order for the winter.

A few pears and apples may yet be hanging on the trees; these may be gathered as soon as they have had “enough of the tree,” or at any rate before hard frost sets in. These late ripening sorts are also in general long keeping, and on that account much valued. To keep them safely is a material point, and there is perhaps no better plan than that recommended by T. A. Knight, Esq., president of the Horticultural Society of London. “The most successful method of preserving apples and pears which,” he writes, “I have tried, has been by placing them in glazed earthen jars, each containing about a gallon, and surrounding each fruit with paper; but it is probable that sweet dry oat chaff

might be used with advantage, and with less trouble. These vessels, being perfect cylinders of about a foot in height, may stand conveniently close together, or upon each other, and present the means of preserving a large quantity of fruit in a small room: and if the spaces between the top of one vessel and the base of another be filled with cement, composed of two parts of the curd of skimmed milk and one of lime, by which the air will be excluded, the later kinds of apples and pears will be preserved with little change in their appearance, and without any danger of decay, till February and March, and the best keeping apples much longer. A dry and cold situation, and in which there is little change of temperature, is the best for the vessels; but I have found the qualities of pears to be much improved by their being taken from the vessels about ten days before they are wanted for use, and kept in a warm room, for warmth at this, as in all other periods, accelerates the maturity of the pear. The same agent accelerates decay also, and a warmer climate contributes to the superior success of the French gardeners, which probably arises only from the circumstance of their fruit being the produce of standard or espalier trees."—*Hort. Trans.*

**FLOWER GARDEN.**—The beginning of this month is the time chosen by commercial and other florists for planting the principal beds of choice anemones, ranunculuses, hyacinths, tulips, &c. The ordinary method of performing this work is briefly detailed in a previous article in this number, which the reader may refer to. The other business of the season is raising all roots, bulbs, or tubers, &c., as dahlias, marvel of Peru, or others which would be in jeopardy from frost. Pruning shrubs, as well to keep them in form as to encourage flowering. When the pruning is finished, the clumps and borders, soon as the leaves are down, may be digged; reducing overgrown herbaceous perennials; replacing such as have become misplaced, and filling up vacancies where any have died or are worn out, taking care to keep the tallies, if there be any, in their proper places. This brushing up of the flower garden at this time will give the whole a comfortable aspect, even when the air is filled, and the edges and angles of every leaf are fringed, with frozen spiculæ.

Some of the operations directed to be done in the last and present month may have been executed before the notices appeared, and some of them may yet remain to be done. This is almost always the case, even in the best regulated establishments, and is also almost always right; because the manager, being governed by local and other circumstances, must necessarily be the best judge of the times most proper for the execution of any seasonal work.

## REMARKS ON THE WEATHER.

EXCEPT four or five days about the middle of the month, it has been a showery time, and vegetation has consequently progressed rapidly. Turnips sown a month back are already hoed out, and radishes are as fine as they were in the spring. Spinach, lettuce, endive, celery, and all other autumn crops, are growing freely.

The first frosty nights were on the eighteenth and nineteenth, which, however, did but little damage. The flowers of the dahlias were a little tarnished, and the youngest leaves blackened; the shoots of a few tender shrubs in low situations were also bitten, while those on higher situations escaped. This is invariably the case in the winter season, or in any season when there is frost; the plants in the lowest and most sheltered situations, being most tender, always suffer most, because, there being a more copious evaporation and less ventilation in such places, the frost falls much more severely. Shelter is effective against cutting winds, but it is no protection against frost, unless it acts as a covering.

Formerly, when our seasons were more regular than they have been of late years, the end of the last month and the beginning of this (November) used to be particularly fine and temperate, always considered a favourable circumstance for ripening late kinds of pears. So regularly did this fine weather occur about the time mentioned, that in France it was called "*the little summer of St. Martin*," that saint's day being the eleventh of November. At present, however, there is every sign that wet changeable weather will continue for some time longer; and in the intervals of fair weather, if the sky be clear on nights, white frosts generally occur, and such visitations will require to be guarded against wherever there is anything liable to be injured, more especially if drenched with rain.

*October 25th, 1835.*

PAXTON'S  
HORTICULTURAL REGISTER,  
DECEMBER, 1835.

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HORTICULTURE.

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ON THE EFFECTS OF STOPPING THE BEARING SHOOTS OF FRUIT  
TREES DURING THE SUMMER GROWTH.

THE different methods of training, and the different situations assigned to fruit-trees in gardens, occasion a good deal of pruning and regulation of the growth at different seasons, requiring the exercise of no little skill, and as much attention as any other part of a gardener's business. Fruit trees trained to walls, trellises, or as espaliers, or indeed in any other artificial form, are so far cramped in their tendencies to extend and multiply their branches; it is necessary to keep them in the desired form, or within the allotted space, that the knife, or the thumb and finger, must be frequently employed to check luxuriance, to remove redundancy and decayed parts, and to give scope or right direction to promising or necessary shoots.

It is not our intention at present to enter on the general subject of pruning. It is a topic which has been so often and so well done before, that there is hardly room for any thing new on the matter. And if so common a subject receive no new freshness of complexion from a modern scribe, he writes in vain, and his readers will yawn over his prosy recitations, notwithstanding every direction he gives, and every precept he lays down, have sterling merit, and worthy of all acceptance.

Passing, therefore, the winter pruning of the different kinds of fruit trees, and also the more important, the *far more important*, regulation of the growth in the months of April, May, and June, let us proceed to an ulterior manipulation sometimes performed on the bearing wood of

fruit trees with good effect. This is too often neglected, or, if done at all, is either performed too soon, or too late. We allude to what is called stopping the growth of the bearing wood of wall or other trained trees, whether in houses or in the open air, in order that the flower-buds on the base or lower part of the shoot may be prompted to swell, or be fuller charged with the arrested sap, and consequently be enabled to start with greater vigour in the following spring.

To have a clear view of how far this practice is available, let us trace the summer progress of the shoots of the vine, peach, nectarine, apricot, cherry, and plum trees. All these may bear fruit on the shoots of this summer. They begin to grow, say in the month of April, continue lengthening through the warm season, and stop some time in the autumn. If these young selected shoots stop of themselves any time before the end of September, no manual stopping is deemed necessary, because while thus at rest, the wood is ripening, and the buds are swelling into form, and engrossing their winter covering.

The fruit grower is pleased to see his trees assume this maturing state, as he knows that it is a certain sign of fruitfulness. It is in this state, that if the bearing wood of his vines be short-jointed, and have protuberant eyes, of firm woody consistence, and of a fine hazel-brown colour, those of his apricots, peaches, nectarines, &c., in like condition, he rests satisfied that the trees need no assistance. But if the shoots continue growing after the end of September, he thinks it right to give them an artificial check by cutting off the points. This naturally causes a stoppage in the ascending current of the sap, and an accumulation of it in the remaining part of the shoot, and which will have a tendency to plump the buds, and very likely cause two or three of those near the incision to burst into leaf. If this does happen, the manager thinks it no injury, provided the buds lower down on the shoot be benefited, those at the top which burst being removed at the next pruning.

That this practice is judicious we have no doubt, as we have often seen it effective, and on vines particularly; because a vine shoot, bearing a bunch or two of fruit at its base, may be repeatedly stopped without risking the buds intended for the next year's crop. Peaches and nectarines, as well as apricots, plums, and cherries, may all receive assistance in this way, if the proper time be chosen for the performance. If done after the shoots have ceased growth, it can do no good; and if too soon, many of the buds intended to be preserved will burst, and consequently be useless.

An error which we once committed deserves to be instanced as a practical instance of the foregoing remarks:—A young moorpark

apricot tree had, in the third year after being planted on a west wall, borne a few very fine fruit on the shoots of the former year, and was making some very fine promising wood for the next. The tree had few or no spurs; and, thinking to increase the flowers on the young shoots then in full growth, their points were pinched off soon after Midsummer. The consequence was, every bud on the lower parts of the stopped shoots were developed not into flowers, but in short leafy shoots in October, to the great chagrin and disappointment of the mismanager. A few weaker growing shoots on the same tree which were not stopped, produced a few flowers and fruit; but the principal shoots were, with very few exceptions, barren.

From the circumstance of buds being either developed as flowers, or as leafy shoots, arises one of the most curious though obscure transformations in vegetable economy. Monstrous fruit and flowers are frequent among highly cultivated plants; and we often see the axis of a shoot prolonged through the centre of a terminal flower, leaving the exterior members of the flower behind. This is usually attributed to the interference of art deranging the natural processes of organic expansion, and thereby producing imperfect or over-exuberant formation.

But why are the buds of a luxuriant growing tree almost always resolved into shoots, while those of a moderate growing or even a sickly one are invariably resolved into flowers and fruit? This question we have elsewhere endeavoured to explain; but with what success is not for us to say.

Vegetables are often compared to animals in their generation, gradual growth in youth, full stature, and old age. They both require nutrition, air, heat, &c., and are affected by all atmospheric influences, whether favourable or unfavourable, nearly in the same way. The different species of plants, like the different species of animals, have all a natural or normal form, composed of a compages of various members to complete the individual. Abnormities happen to both: an animal or a plant may grow up deformed; sometimes two embryos are united, and hence a double plant, like two seedlings from a double-kernelled nut, or fruit, like a twin cherry; and hence a double animal partly, or wholly, or separately produced. The different members which compose individual plants or animals have each distinct functions, which cannot be interchanged so as to act for each other without the direction of sentience or the manipulations of art. In animals the osseous, muscular, nervous, circulating, digestive, and generative functions, are distinct, and cannot take the place, or execute the office, of each other, but in very few external movements. The same laws were long considered to be applicable to vegetables; but a new light has suddenly dawned

upon us, and which, if founded in fact, is one of the most wonderful phenomena exhibited in the physical creation.

The doctrine of vegetable metamorphoses forms at present a distinct branch of botanical science, and is taught under the title of *Morphology*. It maintains as a fundamental principle, that the foliage of plants is the grand plastic material out of which all the other members of a plant are formed; that, besides the natural form, colour, and functions of leaves, they are capable of being changed into bractea, involu-crums, spathas, or calyxes; transmuted into the most delicate and highly-coloured corollas, attenuated into filaments, redoubled into anthers, decomposed into atoms of pollen, convolved into columnar pistils, distended into capsules of leathery or bony texture, and filled with tens of thousands of living subdivisions of themselves, whence new individual plants (not leaves) may be raised. Added to all this, the leaves involve each other, in many instances, so that the outermost is a thin cuticle (*epicarpium*); an intermediate one is thickened into a delicious pulp (*sarcocarpium*); and another forms the stone (*endocarpium*); and the amount of all this brings us to the conclusion that flowers are only stunted shoots; that, by the sudden stopping of its lengthening tendency, the leaves become crowded together in whorls, the outermost changing into the external members of the flower, and the central leaves into the internal parts.

This doctrine having originated with the immortal Linnæus, claims, while it invokes, our respectful attention. It is a portion of that distinguished naturalist's ideas, which is now embraced by the highest grade of his followers—the patricians of the science; and who, while they have seized with avidity this transient notion of the learned Swede, have banished from the schools that which was the pride and employment of his useful life—the sexual system of botany.

Whether the doctrine of vegetable morphology be rationally tenable or not, it is not now our business to inquire. That the different members of flowers are occasionally changed into leaves, we are well assured of; but whether the reverse be constantly the case, is, we venture to state, a doubtful matter.

However, it deserves attention, and forms a fine subject for the exercise of an ingenious mind, capable of diving, or of having a wish to dive into the hidden processes of vegetation. On this ground we recommend the subject to the attention of our readers, some of whose opinions we hope to receive before we enter further into the matter.

The grand difficulty lies in conceiving how it is possible that leaf-buds in the autumn may be changed into flower-buds in the spring,



and, by the simple means employed, of only stopping the growth to induce an artificial stagnation. If there existed flower-buds in the autumn, we should be led to imagine that they would remain, and be developed as flower-buds in the spring; but here we see, though we stop the shoots to enlarge or forward the flower-buds, these, if they do burst in the autumn, are not flower, but leaf-buds.

This circumstance is a strong corroboration of the morphologist's doctrine; but perhaps we make a mistake in the identity of the buds. It is well known that three buds are often seated together in the axil of the same leaf. This is commonly seen on apricot, peach, and nectarine trees—one leaf-bud issuing from between two blossom-buds. If, therefore, the central bud be forced into premature growth in the autumn, it may so rob the flowers as to render them too weak to come forth at the proper season. We put this as a hypothetical case; and we shall be obliged by any information which any of our readers may be pleased to communicate, particularly relative to the identity of the buds exhibiting this unaccountable transmutation.—ED.

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## ON THE GERMINATION OF SEEDS.

BY THE AUTHOR OF THE DOMESTIC GARDENER'S MANUAL.

AT page 291 of the fiftieth number, I observed the notice of W. M. upon my experiments on the germination of seeds *laid upon the surface of the soil* of a pot in my hothouse. They were admitted to be conclusive as far as regarded the exact local situation of the seeds under glass, but were thought not to bear upon, or at least to be satisfactory in the case of seeds sown on the *natural ground*.

Before I proceed to state a very simple mode of operating, with a view to impugn or confirm W. M.'s very rational objection, I request the reader to peruse very attentively that correspondent's article, at page 291.

Very shortly after I had read it, and two or three weeks before the termination of the dry weather of the late summer, I selected a spot in a border facing N. W., wherein there was not a weed. The border was backed by an open palisade fence, and therefore was sufficiently exposed to air and sun. I watered a portion of the soil, to the extent, perhaps, of eighteen inches square; then beat it till the surface became level and firm; left it so for a night and day, then watered it again; and, after some hours, observing that the soil appeared merely moist, but without one drop of floating water upon it, I scattered over the surface, as lightly

as possible, the seeds of lucern, broccoli, winter spinach; also a few peas, French beans, and two or three grains of Indian corn (*Zea*). To protect the seeds from birds, or the direct force of a shower, if such should fall, I placed some sticks in the soil at an angle over the ground, and threw over them a loose thread net. Nothing touched the seeds and they were perfectly exposed to the sight.

As the dry weather continued, I gave a light sprinkling two or three times over the net, letting the water fall from the rose of the pot so gently, that the seeds were not disturbed, or forced into the soil.

In a few days the seeds, with the exception of the Indian corn, swelled, and protruded the radicles, which penetrated the ground. The spinach was the most active; the lucern in the next degree so: the husks were lifted up by the plumule, and supported far above the surface. The broccoli succeeded, and the two legumes also followed the same course; the *Zea* did not stir.

To remove ambiguity, and to make "assurance doubly sure," (as it became necessary to give occasional waterings, owing to the absence of rain or dew,) the seeds had been repeatedly taken up, examined, and cautiously laid again upon the surface, till it became certain that the progress of growth was absolutely established. Finally, many plants were as perfectly formed and *fixed* as any that I ever saw, when the usual process of sowing had been observed. Husks (*testæ*) were thrown off, and the seed-leaves expanded; in a word, the vegetation was complete.

I have stated a simple tissue of facts, seen and attested; hence I must assert that *seeds will germinate in a full exposure* to sun, air, and water, without any covering of soil whatever. The phenomena thus artificially induced are, indeed, in exact accordance with those which, I firmly believe, take place in natural situations, in hundreds of instances; still, however, I am perfectly ready to admit that sowings, with a slight and appropriate covering of soil, are to be preferred. I only argue that your first correspondent's case is made out, and the fact established, that plants will grow, and develop all their parts, from seeds dropped upon the bare surface of the ground, without any covering of soil, or other protecting screen whatsoever.

G. J. T.

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#### ON THE SEASONAL GROWTH OF PLANTS.

THAT the growth of plants is affected chiefly by the temperature of the climate of which they are natives, is well known. On the confines of the frigid zone, and over all the temperate, and part of the torrid

zones, plants are regularly seasonal; that is, they grow, blossom, and yield seeds in one season, and rest in the other. And even in the hottest parts of the torrid zone, although there is nothing like summer and winter, yet there are changes of weather which affect plants in a similar manner. There is the dry season, especially towards the end of it, in which a great majority of plants cease to grow, and even shed their leaves; and many wholly disappear, withdrawing themselves entirely from the light and heat of the sun, and remain in a torpid state till the dry heat is over. This is followed by the rainy season, which recovers all vegetation; the foliage and flowers of bulbs and tubers spring forth from their dormitories, the seeds of herbs are awakened into life, and the shrubs and trees all put on a new livery.

In latitudes where the regular seasons of summer and winter are constantly experienced, the development of plants in the one, and their torpidity in the other, are common occurrences, and every day before our eyes. And although it be perfectly obvious that the changes of temperature are the principal and ostensible causes of vigorous action, and rest alternately, there are instances of particular plants, which though they obey the revivifying influence of the vernal season, stop long before that degree of heat which first excited them to action ceases in the autumn. Of this fact the common ash tree (*Fraxinus excelsior*) is an instance: although it is one of the latest in coming into leaf in the spring, it is one whose summer growth is quickly over, rarely extending its shoots after the month of July; and sometimes its growth ceases soon after Midsummer.

This circumstance plainly shows us that heat alone is not the agent which can cause vegetable development to be progressive, and that it is not the southern declination of the sun, nor the diminution of his power which arrests the growth of some plants, but rather that there is some constitutional law which regulates the growth by impulses; certain portions of the organisation being developable, and when this is complete a pause takes place for a longer or a shorter time.

Most of the plants in the temperate zones make annual pauses. Their visible growth and the annual divisions of their woody structure show this very evidently. Some few there are which make a double pause; a short one at Midsummer, and a long one during winter. The oak always, and the horse-chestnut frequently, present this Midsummer rest, succeeded by what is called the Midsummer shoot.

In the equatorial regions the pauses or cessations of growth are caused, as already observed, by the alternations of the dry and rainy seasons; and although in constantly humid or marshy situations, there

is no appreciable difference in the verdure, yet, on examining the ligneous structure of the trunks, we plainly see that it is formed by pulsations, as it were; instance the mahogany, satin-wood, and other tropical kinds of wood used in manufactures. But in respect of these just mentioned, we are not certain that the concentric rings of wood, on a transverse section of the trunk, are annual layers, because, for aught we know to the contrary, they may be deposited at twice or even thrice in the course of twelve months in those exuberant climates. In this temperate country it has been repeatedly proved that there is a deposit of new wood in every year of the tree's life; but of tropical trees we have as yet had no positive proof. Travellers in those countries cannot have leisure to prove this matter; and we have heard of no resident who has attended to this particular.

A question occurs—is there any such a thing in any climate as an ever-growing tree? Among herbs and suffruticose plants, there are, perhaps, many which, being placed in constantly uniform circumstances of heat and moisture, are ever-growing, more especially those which emit roots from their lengthening stems, and which at the same time produce both viviparous and oviparous progeny; that is both runners and seeds. All that are called creeping plants are ever extending themselves, if sufficient heat and moisture be present; but this process is not a constantly increasing growth of the original stock, but an increase of numbers or bulk of the offset progeny. Such instances are frequent among the grasses, whether purely herbaceous, like the sheep's fescue (*Festuca ovina*), or woody, like its gigantic congener, the bamboo. This latter is a stolon plant, and, in its native country, appears in an ever-growing state: its aggregated stems are ever rising in successive gradations, from the green succulent shoot, peeping through the soil to-day, up in various heights to nearly four-score feet.

But if there be any plant which may be truly called ever-growing, we will most likely find it among the palms. The growth of these majestic trees really appears to gain altitude by an incessant progression, without manifest pause or periodical interruption. And this appears much more evident from examination of the internal structure of the stem, than from constant observation of the external development. Frond after frond rise from the centre of the bole, and are consecutively expanded; and though we may reasonably fancy that the growth may be more rapid during the monsoons, there is certainly no sign of anything like grades to indicate cessations of growth or interceptions of the structure of the wood, the whole being a uniform combination of longi-

tudinal fibres embedded in coarse cellular membrane, without divisions either horizontally or vertically.

That this may be the case with some of these plants is probable, not only from the uniformly exciting climate of which they are natives, but from the rigid character of their exterior, the bark being harsh, and the foliage, even in its young and most tender state, is of the toughest texture; hence not easily affected by changes of weather. And as the fruit of several of them is, like the fronds, successively (not annually) produced, there seems to be less necessity for periodical pauses in their growth than in the case of trees otherwise constituted.

How different is it with the tuberous and bulbous-stemmed plants of tropical and other countries. Soon as the monsoons or autumnal rains set in, they come forth in great vigour, bloom in great beauty, but quickly retire from the increasing heat, leaving their seed to be ripened and shed in the dry air, while their vital principle reposes unseen in the bosom of the new bulb or tuber which has been formed or enlarged simultaneously with the seed, and in which it remains secure till the arid heat is over. This is exemplified in the *hæmanthus* of Africa, the tuberose of India, the potato of South America, and the snow-drop of Europe. Were these plants unprovided with those substantial tuberous or bulbous parts, they must inevitably perish during the great heats to which their native lands are subject.

But to return nearer home. We observe in the temperate climate of Europe, and where summer and winter follow each other uninterruptedly, the herbs of the field, and the deciduous shrubs of the copse and wood, are active and verdant in the first, and stationary and defoliated in the last. Some of them continue to grow and retain their foliage till destroyed by frost; others, as cultivated bulbs and tubers, the ash already mentioned, and many others, stop as soon as their paroxysm of growth is over. With respect to those which are arrested by frost (and chiefly exotics), their stopping is easily accounted for, namely a coagulation of their juices which stays the current, and consequently checks all distension of the membranes and vessels. But regarding those trees and shrubs which cease growing while the weather is genial, and, as often happens, both moist and warm, we can come to no other conclusion concerning them but to presume that, after a winter's rest, there is a certain division of the system prepared and destined to be developed, and, when this is completed, the season of rest recommences.

This is very evident in bulbs and tubers, whether cultivated in the flower or kitchen garden: a hyacinth ceases growth before Midsummer, and a Spanish onion very soon after; nor can either of these be prompted again into action until they have had a period of rest. In

these cases it is very clear that atmospheric heat, abstractedly considered, is not the sole agent in vegetable development, otherwise the growth, both as to vigour and duration, would always be equal to the intensity of the inciting cause ; and, according to this rule, the development at Midsummer, when the sun's heat is usually greatest, should be more luxuriant than at any other time of the year. This, however, we know is not the fact ; and, therefore, we can only rationally attribute the stagnation of growth at any period of the warmest season to some constitutional peculiarity of the plants respectively.

In regard to annual, biennial, and perennial herbs, their development is easily comprehended. They grow up, flower, ripen their seeds, and die entirely in the first and second years, if annuals or biennials, or die down to the ground if perennials. The annual growth of a tree or shrub having a permanent head is very different. These have a certain number of shoots, leaves, flowers, and fruit to mature, and moreover a new layer of wood and a new liber to distend and maintain. This distension is effected by the rarification of the sap stored in the cellular and vascular membranes inducted in the last or other bygone years, and this rarefaction and expansion is supplied by water and other elemental food absorbed by the roots from the earth, and by the stomata or pores of the bark and foliage from the air.

Now, if there be not a sufficient supply of food collected from these sources for the amplification of the shoots, leaves, flowers, fruit, and new layers of wood and bark, the full expansion of the parts cannot be complete, and of course the growth will cease early in the summer, or the expansion of the different members will be both slow and diminutive. But, on the other hand, if the plant be healthy, and can supply itself with a full quantum of food, the expansion of every part will be more ample, and the growth longer continued. But even under those favouring circumstances it does not appear that the growth will be continued longer than the period necessary for completing the previously prepared portion of the organisation, unless art interferes to derange the process. For instance, if an annual plant be cut over early in the season, and before either flowers or fruit are produced, other shoots will be produced to complete the purpose of the plant ; and if these be again cut off, this mutilated being, whose period of existence is predestined by nature to the space of only a few months, may be kept growing for twelve or more : this happens with many of the grasses. So if a shrub, a rose, or a rose-acacia, be pruned back as soon as they have yielded their first flowers, they will shoot and flower again in the autumn. The like takes place on the development of trees, and fruit trees particularly : if their first shoots or flower-buds be destroyed, others

will subsequently come forth to make up the loss, and the seasonal growth be greatly prolonged.

From all these observations, and from the instances adduced, we are led to infer that the great majority of plants are more or less seasonal, that they have periodical states of action and repose, and in many cases we have reason to suppose that the completion of the first depends on the perfection of the second.

Whether plants, like animals, require rest, is a question which can be answered only by the facts observable as relative to them. That they have rest from this change of seasons is manifest; and that they take rest when their paroxysm of growth is over, is equally obvious. Many of them even appear to sleep; for as soon as the light of the sun is withdrawn, their winged leaves drop from their erect or horizontal position, and hang listlessly till the next dawn of day. Thus it would seem that plants require to be restored after the excitement of the summer. But we have further to inquire whether this rest be necessary, and whether plants be invigorated thereby? That it is necessary is obvious, because it is an incident in the course of nature; and that they are recruited in their vegetative powers, may be believed, by comparing the vernal with the autumn growth; their winter rest is only a kind of torpidity, in which their vital action is not wholly repressed. There is always some visible motion, however slow, particularly in the swelling of the buds, the emission of root fibres, and the occasional oozing of sap from a wound made on the south side of a tree, even in the depth of winter. And as the interior of a stem is always warmer than the surrounding air, there may be some kind of elaborating or assimilating process going on, which may have a chemical effect in changing the crude sap imbibed in the summer into a richer and more excitable fluid better fitted for expansive action in the spring.

Practical experience has assured us that a tree which has been debilitated by removal, drought, or from other casualty, and consequently destitute of the necessary share of this matured sap, shoots feebly, and produces few or no perfect fruit; and in the business of forcing fruit trees, we can very frequently see that if one has been exhausted either by very early or repeated forcing, or from bearing a great crop of fruit, it is less able to be forced early, or to bear a heavy crop in the following year. This consequence is often visible in the open air, where we rarely see two heavy crops following each other.

It is of the utmost importance to the fruit grower to keep his trees in that thrifty condition, that they shall never become debilitated by overbearing, or for want of due nourishment, and particularly that they be always charged with a full supply of elaborated sap, and which is

indicated by the short-jointed, full-eyed, and brown hardy colour of the bark of the bearing wood. And that to mature this still more, a thorough check and complete stagnation of the fluids must be given, to prepare the tree by a season of rest for future exertion. On this principle the practice of *wintering* trees is founded, many believing that a good tight frost for a week or two is really of great good service to fruit trees which are occasionally forced.

Checking luxuriance, either by a very low or a very high temperature, causes prolificacy. But this is a violence which should be seldom had recourse to; for though it may cause the exhibition of the fructiferous, it will debilitate the growing principle.

On the whole, it may be averred that in the cultivation of every seasonal plant, its climatal and constitutional propensities (if we may use the word) should be regarded. In the case of herbs, they are very much under our command: but trees are less tractable; and if in the open air, after the proper soil and situation are chosen for them, and receive annual regulation from the pruner, they must be consigned to all the vicissitudes of weather, whether adverse or favourable.

In our forcing departments we have gained great power over exotic plants, imposing on them new laws directly contrary to the law of nature, to which they are in their native countries subject. We can almost reverse their seasonal nature, and make them so completely the children of art, that we cause them to yield their flowers and fruit at any and every season as best suits our purposes. This is a great conquest, which enables us to enjoy the finest fruits and flowers of warmer countries, even when our own fields and gardens are covered with snow.

In alluding to evergrowing plants, we omitted to notice the orange and the fig. Although neither of these can be said to bear this character in their native climes, yet they both show a continuity of action very different from the real seasonal plants. The first requires nearly two years, or at least two summers, to ripen its fruit; and the second requires an autumn and a spring to ripen its first, and a whole summer and autumn to ripen its second crop. There is, therefore, no disruption between the trees and their fruits during the intervening winters; and we may fairly presume that there is no positive stagnation of the sap to effect a separation of the swelling fruit from the branches. The winter development may be slow, but still, as there is a continued connexion, the phenomena may be considered as an instance of unceasing vegetative action.

Orange and lemon trees are called in this country half hardy plants, only requiring to be defended from severe frost; but whether cultivated



in or out of doors, they keep regularly to their seasonal times of flowering and perfecting their fruit. The fig, however, is a much more versatile being, especially in the hand of the forcing gardener. The same tree kept on a high temperature, may, by proper management, be made to yield two years' crops, that is, four distinct crops in the course of twelve months. This feat has been done; and by choosing the proper variety, placing the tree in the hot-house, and treating it with the most suitable aliment, the same result may be accomplished by any one having command of the necessary means.

No other fruit tree can be better adapted to artificial discipline than the fig. It has no exposed flowers, whose delicate stamens and pistils might suffer from accidental visitations of either too hot or too cold air, or of too much or too little moisture; neither does the maturity of the fruit depend on the impregnation of the ovulæ, so absolutely necessary to cause the swelling of other fruit; for whether impregnated or not, the receptacle continues to swell and become deliciously mature, whether the florets which line its interior cavity be perfect or imperfect. Indeed no perfect seeds are ever produced in this country, as we have neither the male tree nor the caprifying insect to effect impregnation.

This it is which renders fig-forcing so successful, and which is entirely owing to this constitutional habit of the trees producing naturally two crops in the year. No other fruit tree is similarly constituted, though there are several forest trees, chiefly belonging to the coniferæ, which perfect, or, at least, shed their seeds, in the second year.

*Senex.*

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## LANDSCAPE GARDENING.

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### LETTER VI.

I TRUST, my dear sir, that you have, from my former letters, acquired a pretty clear idea of that part of the pleasure ground already described; and it is now my task to conduct you onwards to complete the circuit of this dressed scenery, through which I have engaged to be your guide.

We have left the flower-garden and its business behind. We have also made an excursion along the shady avenue on the left, and returned out of that and gained the leading walk issuing from the north end of the flower-garden. Here we enter among lofty trees, springing out of

a base of shrubs, chiefly evergreens, forming together a sheltering verge round the north end of the flower-garden. Through this verge the walk is rather shady and confined, and so continues for about fifty yards, but gradually opens into a spacious open grove or arboretum, containing all the more choice sorts of forest trees, some of them of great size and beauty. The trees all stand on turf, and are disposed in no regular order, the largest growing sorts occupying the largest spaces, and lower growths irregularly intermixed. Of the first, the oaks, beeches, platanus, limes, chestnuts, and tulip trees are magnificent objects, their branches, in many instances, sweeping the ground. The second, as the different varieties American oak, maples, magnoleas, styrax, catalpas, cedars, cypress, &c., are interspersed in the intervals between, forming openings, little glades, and interesting groups, constantly shifting in their combinations with the position of the spectator, and producing the greatest variety, as well in the character and tints of the foliage as in the ramification, positions, and general aspect of the trees. The branching of trees constitutes a principal part of their character and beauty. Some separate from the bole at a very acute angle, and retain the erect and aspiring direction of the leader; others diverge at right angles, and afterward become pendulous; but a great majority rise obliquely at every angle of a semi-circle, and collectively assume a conical figure, more or less depressed, or more or less regular, according as the lowest branches are fugitive or durable.

The limes, the platanus, the cypress, larch, and the chief of the firs, are beautifully formal. The acacias, white hickory, deciduous cypress, and some of the maples, are lightly elegant; and the oak, the Spanish chestnut, and the cedar of Lebanon, are majestically picturesque. But it is impossible to give you anything but a very loose idea of either the individual characters or of the general effect of this grove of trees. To the philo-arborist it is interesting; and serves the purpose of the general planter by enabling him to choose trees by their comparative merits, whether for use or ornament. An open grove of noble beech trees standing in the park is brought close up to the ha! ha! and which unites the park and garden in this place so intimately, that apparent extent is given to both without any ostensible or offensive line of separation.

The leading walk does not pass through the middle of the arboretum, but keeps trending towards the ha! ha! on the right, and after passing through among the insulated trees, pierces a thicket of shrubs and evergreen oaks on the brink of the sunk fence, at which point we enter upon a very different scene, namely, the view of a fine open and extensive glade across the park. It is an ascending hollow, of which the further end

is not seen, winding round a beautiful green knoll, on which stands an ornamental cattle shed, and over a dip to the right are seen the church spire and some of the other buildings of the town of ———, alluded to in my first letter, and beyond these the summits of the Chiltern Hills bounds the view. The direction of this glade is not only marked by the descending and somewhat winding hollow, but is tastefully flanked by noble masses of beech and other forest trees, which advance or recede variedly along its sides, exhibiting all the stronger and fading lights so interesting to the beholder in the act of prospection. There is a seat at the point where this glade is first seen from the pleasure ground; and its imposing extent and striking features, when chequered by shadows and enlivened by flocks and herds, well deserves a pause to contemplate its varied beauties. Its effect is moreover heightened by comparison with the closer scenes through which we have lately passed; indeed I was involuntarily riveted to the spot on my first stroll, and often review it with increasing pleasure, especially now as the foliage is daily more and more exposed.

The glade does not terminate abruptly at the ha! ha! but is prolonged across to the west side by trees planted within the pleasure ground.

From the seat whence I have been noting the above particulars, the leading walk is carried parallel to the sunk fence, and has here all the advantages and character of a terrace. This is continued quite across the glade till it enters the flanking plantation towards the north. This group is partly open grove and shrubbery. Passing this we have another interesting change of scenery. The high ground to the northward is densely clothed with fine timber trees, rising like the seats of an amphitheatre from the sunk fence at the north end of the pleasure ground up to the crown of the hill. This wood forms the back ground to a fresh feature, which, compared with what we have yet seen, forms an agreeable contrast. On the north of the orchard there was an old gravel-pit, of considerable depth, and in area about three quarters of an acre; this was in the way of completing the plan of the garden and pleasure-ground, but it was wisely and tastefully determined to include it within the sunk fence, and a very interesting thing has been made of it, proving the truth of what is said to be a rule among landscape gardeners, that when a scar or eye-sore deforms a scene, the best cure is either to hide or ornament it. This has been judiciously done with the pit in question; the abrupt banks towards the north were left untouched, except inserting a double strata of rough stones round high-water mark, and raised; and as it was known that there was a substratum of clay below the gravel, the idea of filling the pit with water

simultaneously occurred and was as quickly executed. After leaving an island near the middle, planted with weeping willows, and making a shore on the south side (allowing the water to find its own level to produce an irregular margin), the whole was planted round with trees and shrubs.

This little lake, in the tasteful way in which it has been managed, has all the appearance of being a natural feature. The water reposing in the lowest place is its natural station; and being surrounded by evergreen trees and overhanging shrubs, intermixed with birch, poplars, alder, and willows, gives the whole a truly natural aspect, and besides admits several aquatic trees, shrubs, and flowering herbs, which would be misplaced in any other part of the garden.

Water dammed up in any way, except for the purpose of expanding a rivulet, is not only improper, but in some measure offensive. This element should never be seen but on the lowest surface, or on its way towards it. Lakes exist on the tops of hills, as is the case on this very estate; but it would be bad taste to form such a thing there if lower ground was in sight.

The leading walk carries us round on the outside of the lake or aquarium, as it may be more properly called, and opposite the middle of it, and partly under the trees and shrubs, there is a lapidarium or ridge of rugged stones, formed as a receptacle for alpine, or rock plants, as they are commonly called. This site being in the vicinity of water, and having a north aspect, is well calculated for the growth and preservation of those minute yet beautiful plants. The *Erinus alpinus* is now beautifully in flower, seated on the surface of the stones, where it sheds its seeds and grows like a native. The situation of this rude feature is also appropriate, as it cannot be seen at the same time with anything soft and gay, the proper inmates of a flower-garden. As an appendage to a flower-garden, rock-work should never be made conspicuous, but should occupy, as the one I am writing of does, a secluded spot.

A branch of the leading walk diverges at some distance before reaching the aquarium, and passes in an easy sweep on the south side of the pool, and among various clumps of shrubs and flowers, and evergreen shrubs on the turf, falling in again to the leading walk at a corresponding distance beyond.

Thus far, my good Sir, I have conducted you over half the circuit, and you must now conceive yourself returning southward towards the mansion-house. This side is less varied than the other, but you have still to walk among magnificent specimens of trees, and shrubs, and flowers. The lilacs, with their feathery tufts of purple and white; the mock-orange, breathing refreshing odour; the guelder-rose, with its

waving balls of snow ; the laburnums, like stately trees hung with "golden chains," are only equalled by the frequent tufts of the matchless rose profusely scattered around.

Turning from these beauties as you pass onward, your roving eye will shoot across the ha! ha! to scan the objects in the park. Everywhere on the brow on the right there is a "prodigality of shade," with here and there glimpses down into the western valley, with the ripple on its lake glistening through the trees, but only exciting to have a more uninterrupted view.

Anon you are again environed among shrubs and trees, and, arriving at an opening on the brink of the ha! ha! the walk encircles a venerable elm, having a fixed seat round the base. This appulse of the walk towards the fence in this place is necessary, not only in order to give space for the drying ground and plantations which conceal it on the left, but also for enjoying a most enchanting prospect from the seat just mentioned. From this station the greater part of the west valley, with its lake, the richly-wooded brow beyond, and a retiring dell, through which the stream steals away after its escape from the lake, are all seen to great advantage. It is a scene of unmixed beauty ; the softly waving undulations of the surface of the higher ground forming gently swelling knolls and easy falls,—the tufted groups of deciduous trees crowning the heights or running down the slopes, with the holly and common juniper creeping out from under them,—the single trees irregularly, but not too lavishly dispersed,—the lake, with its varied margin fringed here and there with trees, shrubs, and reeds, its islets, its boat-house and swans,—and the whole of the intervening lawn besprinkled and relieved by deer and sheep and other kinds of cattle, redoubled by their shadows on the smooth turf,—forms altogether a picture of the most attractive description. Here you would be disposed to linger ; but we must proceed. Falling again into the leading walk, we are now approaching the west side of the house, and in our way pass through the orangery. This is almost an entirely glazed building, bespanning the walk, and just wide enough to admit on each side a row of orange trees in square boxes. In the centre there is a circular space, matted, with table and chairs, and when the weather and season admit, is used as a reading-room. This building is rather shady, a few acacia trees being allowed to rise from among the shrubs on the west side : orange trees delighting in a warm shade, a fire flue is carried round within, but only employed in times of hard frost.

We step out of this building upon the terrace, and find that its south end has a façade corresponding with that of the treillage on the east side of the house.

Thus have I conducted you round the circuit of the pleasure-ground, and have endeavoured to describe its principal features as they occur to a perambulator. But I must admit my inability to do justice to the excellence of design and the accuracy of execution everywhere so visible, and all evincing the most refined taste, and a very great share of practical skill. These, indeed, might have been purchased "ready made" by the predecessors of my friend, or the original ideas may have been suggested by talented visitors, as before alluded to; but however this may have been, it reflects the greatest credit on the former possessors, who had the taste to adopt, and the spirit to execute, so expensive and admirable a plan. Nor does it reflect less praise on the present possessor, who so anxiously completes and preserves those more striking features of the place, of which the designers could only have a prospective, and consequently a less perfect, idea.

The bird's-eye view from the front terrace is so varied, and, although so extensive as to command at least one-third of the park, it can never pall or satiate the eye, even most familiar with it. The roving cattle, the time of the day, that of the season, and even the state of the sky, are ever producing changes the most interesting; and this is not a little heightened by the judicious and tasteful manner in which the forest trees composing the groups and masses are associated. The different tints of the foliage have been well considered and blended; not rendered "spotty" by regular intermixture, but by planting in masses, so that the most sombre hues occupy the recesses, and the lighter greens and yellows are preferred for the more prominent stations. For the latter purpose, some of the maples are most efficient, as their greenish-yellow flowers and leaves make them particularly conspicuous.

The woods and groves on the south side of the park have been all preserved or planted with reference to the house. This, as a central point of view, has all the glades and vistas converging thereto, thereby giving scope in every direction from the windows; but you must not imagine that these glades are like regular avenues; on the contrary, their sides are very irregular, as well in the position as in the various kinds and habits of the trees which form the margins. In fact, the glades are formed by a series of groups standing behind each other, and enlarging as they recede from the house. This gives an imaginary length to the glades, and depth to the woods, which they really have not when seen from other points of view. Indeed, in riding round or through the park, the cross glades and openings are productive of the finest combinations of lawn and grove where they might be the least expected.

But as I shall have to say much more of the park in detail, I shall

break off here, in order to return to the other gardens to which you have not yet been introduced, but where we shall meet in my next letter. Meantime, remaining your's, &c.

A. B.

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## FLORICULTURE.

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### REMARKS ON THE DAHLIA.

*To the Editor of the Horticultural Register.*

SIR,—I take the liberty of addressing myself to you on the subject of the Dahlia, as I have not seen any article on that flower since I have been a subscriber. The dahlia has become one of the fashionable flowers, and also very generally grown by all classes, and is now held in the same esteem as the tulip was formerly, though by no means has it arrived at that state of perfection which the tulip has attained. Still it is one of the most showy and ornamental flowers in general cultivation, and worthy of any care, as I believe it has not nearly reached the acme of its perfection. Five years ago there was scarcely a good double dahlia compared with those now in cultivation; and in ten years more, if the mania lasts so long, new ones will throw into shade even the beautiful *Criterion* or the *Springfield Rival*, which I consider as good as any that have been produced; the former for its beautiful colouring of purple tip and white ground, the latter for its compact and perfect form.

Allow me to add a few remarks on the cultivation. The dahlia being tuberous-rooted, like the Jerusalem artichoke, it is therefore generally supposed that a light soil suits these plants best; but with the dahlia a light or too rich a soil is bad, as the one produces too great a quantity of root, which is not the object, as in the potato, and the other causes it to produce too much top, and foliage of a dark colour, producing flowers, neither so perfect, nor are they so clear coloured. But the soil which suits these flowers best, in my opinion, is one naturally good,—neither light nor heavy, but between the two, and which has not been too long under garden cultivation. This soil I have tried with the greatest success; the colours are clear, and the flowers are generally more perfect than the same sorts in a much richer soil. There is another advantage in this kind of soil: it is cooler and more damp in dry weather than a very light one; and this is very requisite to the dahlia, as it improves the colour, and keeps the plant in a more moderate state of growth.

Amongst the most beautiful of these flowers are the two varieties above-named. The *Queen of Dahlias* is equally handsome, being

an edged flower. There is also *Widnall's Apollo*, which is one of the best scarlet flowers; and the *King of the Whites*, as a white flower, is yet unequalled. I think the *Register* ought to give occasional notices of this beautiful flower, and hoping to see some account of it soon,

I remain yours obediently,

October 20th, 1835.

Iaxos.

### MISCELLANEOUS INTELLIGENCE.

A CURIOUS display of the constitutional structure of the pine-apple has lately occurred in the Exotic Nursery of Mr. Knight, King's Road, Chelsea. A few plants of one of the common varieties were placed among other plants in one of the stoves. They did not receive *pine culture*, but were kept cramped in the same pots for a considerable time, and consequently arrived at no great size. This confinement, however, did not prevent, but rather hastened, their showing fruit, but of so diminutive a size that they were not worth going to table. No suckers of any size were produced; but the crowns took a new growth, and in their turn showed another fruit, making two on the same stem. Nor is this all, the second crown of one of the plants was also excited into a new growth, and has now put forth a fruit, being the third on the same stem, and nourished by the same root.

This uncommon appearance has been occasioned by the artificial state in which the plants have been kept. If they had had space to have admitted expansion, and fresh diet to have nourished and amplified their various parts, the first fruit would have swelled to the natural size, the aftergrowth of the crown would have been checked, and suckers would have been produced from the bottom of the stem in the usual manner; but the atmosphere in which they grew, being both very warm and very moist, excited the stem more than it did the roots (confined as they were, and without the means of increase), so that its upward growth was accelerated, at the expense of the fruit, which were small and worthless.

OF THE TEA PLANT.—Accounts have been lately received from India, and published in the *Gardener's Magazine*, that the tea-plant has been found wild in Upper Assam, within the Company's territory, north-east of Bengal. As this new country is bordering on the western boundary of China, it is very probable that the original tea, so easily distributable by seed, is indigenous to that so little known district.

It has long been an object of the East India Company to introduce



the tea-plant with its culture into the northern provinces of India : now it is confirmed that the plant will thrive there. Whether its culture and the manufacture of the leaves may be as cheaply executed in Assam as in China, is a question, the answer to which will determine how far the discovery will or will not be valuable to the Company. If the Assamese be tractable, and if they be as indefatigably industrious as the Chinese, can subsist on as cheap food, and have Chinese cultivators and overseers to set the business going, the cultivation may be profitably established, prosecuted, and render dependence on the Chinese market less necessary than it now is. But if the Chinese can keep the tea monopoly to themselves, and undersell the Assamese and all others, any speculation of the Company to manufacture their own tea must prove unsuccessful.

However, the very attempt to compete with the Chinese will do much good. It may moderate the supercilious hauteur of the celestial empire, and compel the emperor to be a little more accommodating in his commercial relations.

The new territory is spoken of as being salubrious, temperate, and fit for the production of all European as well as Chinese plants ; and if it also be suitable for the culture of rice (the grand and indispensable necessary of life in those countries), this would greatly facilitate the introduction of any rural improvement, or any new branch of manufacture. Silk, cotton, tobacco, New Zealand hemp, &c., may all, no doubt, be cultivated to advantage in such a climate. And whatever is undertaken and upheld by the powerful protection and assistance of the Company can scarcely fail to succeed, more especially if recommended by such a philosopher as Dr. Wallich, who has sent home the intelligence alluded to above.

Mr. Loudon has suggested that the expense of manufacturing the tea may be, he thinks, much reduced by a more speedy and less particular mode of curing. This may be practicable ; but the public taste must be consulted ; machinery may be employed in the drying, and other expedients may be invented to expedite the process ; but the elegant and convenient condition of the article, as well for retail as for use, must not be much changed.

IMPROVEMENTS IN GARDENING (*continued from page 436*).—The first, and perhaps the most important improvements to be mentioned are those made in the culture of some of the old, and by the introduction of many culinary vegetables, unpractised or unknown to gardeners half a century back.

The new practices in the treatment of old-established kitchen-garden plants are but few ; but among them may be noticed the now-prevail-

ing custom of sowing a full crop of onions, to stand the winter, for the service of spring and summer consumption, in a green state. This custom is much more the business of the market than of the private gardener; because, if the latter has a bed of Welsh onions or chives for salads, and a good store of common bulbs in the loft, there is less call for cibouls; whereas the former can dispose of vast quantities of this crop along with the radishes which come in during March and April. This practice is, however, adopted in every private establishment on a moderate scale; and not only for spring use, but for the purpose of transplanting these autumn-sown plants in March, for the purpose of bulbing in summer. It is true, many of these run to seed before they attain full size, and of course do not bulb; but they are useful even in their run-away state for soups, &c.

Transplanting onions is a practice of but recent introduction; a custom, we believe, borrowed from the Portuguese. By this means very large onions are obtained. The bulbs to be transplanted are sown late in the spring, on a shady and rather dry spot, and very thickly together. Here the plants starve each other, and produce very small bulbs, which, when done growing, are taken up, cleaned, and stored, to be replanted in the spring. By this management the nature of the plant is so far changed, that, instead of a biennial, it becomes a triennial. In the first summer it passes its youth; in the second, arrives at full bulk; and in the third, produces seed—a full-sized bulb being necessary, it seems, to ripen seed in perfection.

Transplanting peas and common beans is an old custom; but it is, perhaps, more practised now than formerly, showing that the practice is good.

Kidney-beans, both dwarfs and runners, are found to bear much sooner if sown early in the spring in a *place of safety*, and there kept in a stunted state till the frosty nights in the beginning of May are over; and if then put out, will present their flowers in a very short time. This we consider a very useful improvement, and which merits general introduction. That the runner is a perennial or a biennial, was discovered by the late Mr. Sweet many years ago, and by several others soon afterward; and it was found that, if the roots were taken up, and kept through the winter in sand, as those of dahlias, marvel of Peru, &c., are, and planted out in the beginning of May, they will shoot and bear again in summer. But this second crop is inferior to that yielded by seedlings, and, therefore, saving the roots is of no practical use, unless, indeed, the season is so adverse that no seed can be saved.

Sea-kale was in almost every garden fifty years ago, but very little

use was made of it ; and as to forcing it, it never entered into a gardener's head. But from the circumstance of this vegetable being often brought to table in the city of Bath, even as early as Christmas, and this, moreover, gathered wild on the southern shores of Devonshire, instigated gardeners in distant places to set about forcing it, which was found a most easy proceeding in many different ways, which need not be adverted to here.

Planting asparagus in single rows, and forcing it in the open air by linings of hot dung placed in the alleys between the rows, is a new practice, but only followed in first-rate establishments, where there is full command of the necessary means.

Rhubarb, which fifty years ago was only kept in gardens as a curiosity, or for its roots, (used occasionally as a domestic medicine,) is now become one of our most useful culinary vegetables, rivalling and even preferred to the best-keeping apples, or to the most valuable preserves. This is, perhaps, one of the greatest modern discoveries and adaptations of vegetable matter to the use of man, that has been made for many years. Nor is it confined to the tables of the rich ; its culture is so extended that, in the season, it is within reach of every the poorest man. It is also forced with the greatest facility, and with a very little extra trouble may be had at any season of the year. It is also said that, in conjunction with its value as nutritious food, its celebrated medicinal virtues are at the same time administered, and in the mildest form.

Even the old homely cabbage has received a share of the physiological acumen of enlightened moderns. It has been found that if its side-shoots, which rise from the stem after the principal head is used, be slipped off, and planted in good fresh ground, they will, instead of running up to seed, as they would have done if left on the mother stem, strike new roots, and turn to be good sizeable cabbage. Even this may be a useful expedient at times, when no young plants of sufficient size are to be had.

Winter spinach has been brought to an uncommon size of leaf by sowing it thinly in richly-manured shallow trenches, which induces luxuriance ; but it is only in very mild winters that this method of culture can be considered an improvement, as it is much more liable to be killed by frost than it is when sown broad-cast on the surface, as usual.

But the modern improvements in gardening do not consist so much in the improved culture of the old culinary plants, as in the vast number of new varieties which have been added to the old stock. These are almost out of number. A seed-list now lying before us,

circulated by one of the most respectable seedsmen in London, enumerates thirty-four varieties of the common garden pea, exclusive of field varieties. Of common beans there are twelve sorts; and of kidney-beans, runners, and dwarfs, there are twenty-two varieties. Of broccoli there are nineteen kinds, five of which are the Cape varieties—all rarities to an old gardener, but certainly the most valuable acquisition to the kitchen-garden which has been made during the last century. Then, instead of six or seven sorts of cabbage, we have now above a score; seven sorts of carrot; four of cauliflower; eight kinds of celery; twenty-eight of lettuce; fourteen different varieties of onion; sixteen kinds of turnip; and of potatoes innumerable.

That our seed catalogues are too voluminous, may be true, and that a greater variety may be had in the seed-shops than ever were seen in a garden, is probable; but out of such numbers a good assortment may easily be selected for any one establishment, as it but rarely happens that every variety is wanted in the same place.

Besides many new varieties, we have a few new genera admitted, or proposed for admission, into the kitchen-garden. Love apples, vegetable marrow, and New-Zealand spinach, have been cultivated for several years; and the quinoa and oxalis crenata are following their compatriot, the potato, from the wilds of South America: Ginger is now successfully cultivated in hotbeds for preserving; and there are several other things of minor importance which extend the business and increase the products of the kitchen-garden far above what was common sixty years ago.

When we turn to the fruit department of gardening, we are no less pleased with the advances which have been made in the practical management of fruit-bearing herbs, and shrubs, and trees, than we are astonished at the vast accession of new sorts. While one writer describes scores of grapes, and peaches, and nectarines, another nominates hundreds of apples, and pears, and gooseberries. If one gives a list of twenty-five excellent melons, another gives a minute description of *forty-nine* distinct varieties of the pine-apple. In short, our fruit catalogues form a good-sized octavo volume; and the numbers are not more astonishingly great, than is their excellence and perfection when brought to table: and it is no vain boast to assert, that as fine grapes and pines, plums, cherries, and early pears and apples are produced in Britain as in any other part of the world. As to smaller fruit, even the indefatigable Dutch gardeners do not excel us; for even the changeableness of our insular climate is subdued by the affluence of our patrons, and the eminent skill of our brethren.

Our superiority as fruit-growers arises mainly from the excellently-

planned structures erected for the different kinds of fruit in cultivation. Vineries, peacheries, &c., are on the most ample scale; and every facility for heating and ventilation is ingeniously contrived. Nor are we now confined to the oftentimes uncertain effects of smoke-flues; both steam and water are employed as media for conveying and giving out heat, and by apparatus so simple and efficient, as to carry it in any direction—evolve it in any moderate degree, and with very little additional expense either on the score of material or attendance. By a well-planned hot-water apparatus, an extensive range of hot-beds may be worked without the aid of any fermenting substance whatever. Such means were unknown to our fathers; and though they compassed many things, (highly to their credit,) particularly in the production of the finer kinds of fruit, they were accomplished at considerably greater expense, and at a great deal more personal labour.

The profession itself has had a lift: a gardener is, now-a-days, not only expected to be a vegetable and fruit-grower, but he must also be a florist, and well acquainted with botany and the cultivation of exotic plants. In many places he is called on to act as a garden architect, forester, and land-steward. The education of the rising generation of gardeners should be, and really is, on a higher scale than that formerly deemed sufficient for any one intended for the business. The union of botany with gardening has, in a great measure, caused this; because some slight knowledge of both Greek and Latin is necessary, if for nothing more than acquiring the right pronunciation of the proper names.

Upon the whole, it may be truly asserted that, as already observed, both the profession and its professors have been greatly improved within the time first mentioned; and, notwithstanding this altered state of things, there yet remains much to be discovered concerning vegetable expansion and accretion, and still much more room for improved practice.

This paper would be very imperfect, and stupidly partial, were it to omit honourable mention of one class of gardeners, who, as a body, deserve to be placed at the very head of the profession:—we mean the market gardeners in the vicinity of London and other large cities. The names of Willmott, Nettleship, Knyvett, Hutchins, Bagley, Poupart, Fitch, &c., will be long remembered about London; and those of Darling, Peacock, Williamson, &c., about Edinburgh. It may be truly said, that almost all the most useful improvements in the art of raising culinary vegetables, have originated and been first practised among market-gardeners. The grand scale on which their business is carried on, and the superior style in which it is executed, is, to a stranger,

quite astonishing ; and the immense capital required and employed in raising vegetables for the London markets, is inconceivable. All their proceedings are carried on so systematically,—crop succeeding crop so incessantly and properly,—that not an hour of time is ever lost, or a square yard of ground ever, it may be said, seen unoccupied, or uselessly idle. Their rotations of cropping are based on the best principles fixed by long experience, and in many instances quite distinct from the rules of culture pursued in private gardens. Each compartment of their ground undergoes a course of cropping ; common vegetables alternating with fruit-bearing herbs, shrubs, and trees ; that which has for several years borne common culinary vegetables, is dressed and laid down for two or three years with strawberries, or planted with raspberries, currants, gooseberries, or with apple, pear, or cherry trees, each of which are allowed to stand as long as they are profitable, but no longer, when the soil is again broken up, and returned to the production of common vegetables.

ON THE TENDENCY OF PLANTS TO REPRODUCE THEMSELVES.—It is a general law of nature, obtaining in both the animal and vegetable kingdoms, that, in order to perpetuate the species, each individual or pair of individuals are so constituted, that by a union of their powers respectively progeny is produced.

It is remarkable, that in both those kingdoms the manner of production is similar. The eggs of animals are very similar to the seeds of plants ; and the bulbs, and tubers, and suckers of plants bear a strong resemblance to the viviparous young of animals. Increase by division also obtains in both : the division of the polypi is exactly like the production and separation of the sporules of fungi and other inferior orders of plants.

But vegetables are endowed with greater powers of reproduction than animals. The latter have only one manner of reproduction, from which there can be no departure. Oviparous animals cannot bring forth young viviparously (except in a few instances among insects), nor *vice versâ*. Whereas among plants we find many that can reproduce themselves in three different ways, namely, by seeds, by offsets, or by suckers ; and what is very remarkable in such cases is, that whichever of these take the lead in productiveness, the other two are neutralised or nearly so ; and this versatility of character may be made so subservient to the purposes of the manager, that he may have whichever of the three he may choose. If offsets be wanted from a bulb or tuber, or from a fibrous-rooted plant, the flower stem or stems must be cut off ; and if seeds be the object, then every new offset or tuber should be displaced as soon as it makes its appearance.

We have been led to make these remarks from observing (the first time in our life) in the Chelsea Botanical Garden, ten days ago (Nov. 2nd), the flowers of the Jerusalem artichoke (*Helianthus tuberosus*) nearly expanded. This is a circumstance which but rarely occurs in this country, owing, no doubt, to these plants being cultivated in rich soil, which induces the production of tubers rather than flowers.

But this last summer has been remarkable for its great heat and long continued drought, and consequently, the soil being exhausted of that degree of moisture necessary to the production of tubers, an extraordinary effort has been made by the plants to reproduce themselves by seeds; and which is quite conformable to the general law of vegetable development, as instanced in other similar cases.

The ingenious T. A. Knight, Esq., P. H. Society, has founded a rule in practice on this very circumstance, as applicable to the potato. The greater number of the varieties of this useful plant reproduce themselves by both seeds and tubers at the same time. But it forcibly struck the inquiring mind of that gentleman that no plant can produce both in such quantity or perfection as one of them only. And he also knew that, by defructifying the top, additional energy would be given to the underground offspring. This was sound philosophy; and the results of manifold trials have been to confirm his doctrine.

On the same principle other practical expedients are based. Both Dutch and other florists not only prevent their breeding bulbs from flowering, but mutilate by cutting off the upper half of their most valuable bulbs, to cause an extra ejection of offsets. And our own exotic plant growers find it difficult to propagate some of the choice African bulbs without having recourse to the same manœuvre.

There are several other plants which show this property of reproduction by other than the ordinary modes. Wheat, which is either an annual or biennial, according to the time of the year at which it is sown, will, if repeatedly eaten or cut down, continue to produce side shoots, and ripen seed in the third year. The strawberry, if divested of its first flowers, will produce others, and yield fruit in the autumn. A filbert tree, surrounded by a great number of suckers, seldom bears many nuts. Horse-radish, whose growth is chiefly towards enlarging the root, seldom flowers or bears seed; and many other similar instances may be adduced.

The knowledge of this power or faculty of plants is necessary to the practitioner, whether in gardening or farming. The first, by directing the vigour to the useful members of the plant, may have them in greater perfection; and the second, by mowing his thin crops of grass early in the season, will much sooner obtain a thicker sward.

**A FEW REMARKS ON THE EXPEDIENCY OF FORMING A SOCIETY OF PRACTICAL GARDENERS, &c.**—This is an age in which science of every description is advancing with rapid strides, and when every branch of professional knowledge is pursued with unceasing ardour. It is, therefore, rather to be wondered at that, notwithstanding there is in the neighbourhood of London such a numerous body of intelligent gardeners, they are generally almost utter strangers to each other; nor have they among themselves any place or fixed time of meeting for social intercourse or intercommunication, so necessary for those employed in a business which is ever improving. The advantages of such associations are manifold. There would be an interchange of opinions on important points of practice; there would be various reports of past experience, or of present proceedings; that which was obscure to one, might be elucidated by another; and that which one failed to understand, might be explained by others of the society. At all events, the young would be benefited by the conversation of their older or more experienced brethren, and the seniors would have an opportunity of expounding what they knew by way of answer to the questions of their juniors.

The advantages arising from such a society would conduce to the advancement of gardening, by the remarks which would incidentally occur in conversation, as well as from the reports made by such members as are always as generously inclined to give as to receive instruction. From such a company of intelligent men, meeting occasionally to discuss professional questions, much mutual benefit must necessarily accrue, as well in a business point of view, as for fostering that friendly feeling which should always subsist among those engaged in the same pursuit.

Such a society would, in my opinion, have another good effect, namely, by bringing into play those intellectual powers which are now, perhaps, lying dormant. Questions to be proposed to the society may either be written or propounded verbally, and answers or comments the same. Such voluntary tasks would not only be amusing, but would call for the exercise of those mental powers, the command of which is so necessary in our progress through life.

I trust these few remarks will suffice, for the present, to show my brethren around what I should be very happy to see instituted.

*Chelsea, November 14th, 1835.*

A. WALKER.

[We quite agree with our friend, Mr. Walker, that such a society would be of much service to those who, like himself, are anxious to improve themselves by that mutual interchange of opinions to which he alludes. We can only say that the Horticultural Register shall be



open to himself, or any friend who may wish to publish anything further on the subject.—ED.]

OUT-DOOR CULTIVATION OF THE VINE.—“The annual dinner of the Society for Cultivating the Vine in the open Air, according to the suggestions of Mr. Clement Hoare, of Sidlesham, took place at the Dolphin Inn, on Friday, at Chichester.”

Sir,—The above paragraph, extracted from the *Brighton Guardian*, would seem to imply that the gentleman therein mentioned has some particular and advantageous mode of managing out-door vines. As I think there is a great deficiency of knowledge as to the best manner of cultivating this fruit out of doors, it would be gratifying to me, and, I should think, to many of your subscribers, to learn the peculiarities of Mr. Hoare's management; and if you, or any of your correspondents, can give the required information, it would oblige an old subscriber.

*Suffolk, November 9th, 1835.*

ON FREEING GOOSEBERRY TREES FROM MOSS.—It is now some time since I addressed you on the subject of insects pernicious to fruit trees, when I promised to send you specimens of such as infest the gardens and fruit trees in this neighbourhood, and I am sorry to say it is too late to fulfil my promise till next spring, when I intend to devote myself to that object, and I will be particular in sending either drawings or real specimens of such as I am able to prove injurious, either to culinary vegetables or to the roots and flower-buds of fruit trees, to your publishers. I must beg to make a few remarks on the destruction of moss on fruit trees, and particularly on the gooseberry, which has long been considered one of the finest dessert fruits, as well as most useful to the domestic gardener, and great care has been taken to bring it to that state of perfection which it has now reached in this part of the country, and I hope a few remarks which I may make will not prove useless. My gooseberry trees were always much infested with moss, which is generally thought to be injurious, and I was at a loss how to destroy it, till I read a recipe for that purpose in the *Gardener's Manual*. The composition consists of the following ingredients, in this proportion:—six pounds of quick lime and four ounces of flour of sulphur, mixed with water till thick as cream. This I applied by means of a brush to the stems and main branches of all my trees, which were covered over with a fine green moss. This mixture sets quite hard a few hours after it is applied, and is not removed by rain or watering the trees; but as soon as the trees begin to grow, or about April, the mixture falls off, which is caused by the expansion of the bark, leaving the trees (as high as the mixture was applied) quite

smooth, of a dark colour, and apparently much healthier looking. Now if moss be really injurious to trees, I should recommend this as an excellent remedy; but it is a subject upon which I have doubts, as the moss begins to grow as the winter approaches, when the strength of the soil is not required, and I believe it partially dies in summer. Perhaps it may be useful to defend against frost, as I believe it is more common to fast-growing trees, which must be more liable to be hurt by frost than slower growing trees, or trees of more solid substance. I believe moss is, strictly speaking, a parasitical plant, which is generally considered rather *injurious*, and I believe the reason is, it is supposed to deprive of air the tree upon which it grows. Now supposing it to begin to grow as the winter approaches, which I believe it does, do you think it does injury? as I cannot conceive that much air is required to a tree in a torpid state, as is the case with most trees in the winter. You may possibly not have seen trees in such a state as I mean. My trees were completely covered with a kind of *moss* (I believe that is the proper term), very like velvet in appearance, which, I should think, would partially close the pores of the bark against air, and if it did not die off in summer, I should say would kill the tree in a year or two, as I believe a free circulation of air is as requisite to a vegetable as to an animal. The question I wish you to honour with your attention is, whether you think moss is injurious or not, and whether applying such a remedy as I have named is not wasted, as I must here state the crops of berries were not very fine, but the apple trees bore very well. One instance I must mention of a small tree ripening upwards of one hundred apples; this tree is very young. If you think moss is injurious I should strongly recommend the above recipe, which I applied at the end of February, and which fell off about April, together with the moss, not failing in any instance in leaving the trees free from all moss and rough bark. Leaving this to your consideration, and to people more capable of deciding on the question than myself, I remain your obedient servant,

Derby, 15th Oct.

J. G. B.

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#### NOTICES OF BOTANICAL PUBLICATIONS.

EDWARDS'S BOTANICAL REGISTER, continued by Dr. Lindley  
The November number contains:—

1. *Cereus triangularis*. Triangular torch-thistle, a native of Mexico and the West India Islands. It was called *Cactus triangularis* by Linnæus, but changed to *Cereus* by De Candolle and Haworth. The

plant from which the drawing was taken flowered in the collection of Sir George Staunton, Bart., at his seat in Hampshire, under the management of Mr. Wilson, the gardener. It has the habit of the night-flowering cereus, as the flowers begin to open about four in the afternoon and fade about ten the next morning. If anything, it exceeds the last mentioned plant in the size of its flowers; the calyx being green, the petals of the corolla a dazzling white, with a broad aggregation of stamens in the centre, through which the style and headed stigma protrudes.

We may take occasion to remark here on the unaccountable tendency of these plants to bloom in the night rather than in the day, a tendency diametrically different from the generality of plants. Many flowers are so obedient to the sun, that they can only "open their enamoured bosom to his ray," and close again when he retires, or if only a passing cloud intervene. It is certainly a difficult question to answer whether it be the excitement of the previous day which causes the night expansion, or a certain constitutional provision of nature to guard the delicate members of those magnificent flowers from the withering effects of solar light and heat. Those of our readers who have the charge of the night-flowering cereus might, by a little attention, soon be able, perhaps, to solve the question above stated. Those well acquainted with the plant can almost always tell in the day before that a certain flower will be fully out at twelve o'clock on the following night; knowing this, they may, by a simple experiment, prove whether the blooming could be retarded by light or accelerated by darkness. Let us suppose that there is a flower-bud fully swollen, and having every appearance of flowering the same evening—suppose again that the plant were enveloped in some kind of covering, which would effectually exclude the light of day about two o'clock in the afternoon,—qu. would this artificial night accelerate the flowering?

Or suppose that about sunset the same plant were placed in a circle of Argand's lamps or other bright lights, would this artificial sunshine retard the flowering till real darkness returned? Such experiments would be at least amusing, and they might settle the question whether the flowers, for their own sake, be or be not afraid of the sun-beams. The fruit of the *C. triangularis* "is described as being quite smooth, of a rich scarlet, and with the size and form of a goose's egg."

2. *Eutoca viscida*. Clammy Eutoca. This plant belongs to the natural order *Hydrophyllaceæ*, and is a hardy herbaceous annual, found in California by Mr. Douglas. The flowers are beautiful, but the foliage "coarse and weedy."

3. *Vanda teres*. Taper-leaved Vanda. A splendid Nepalese orchideous plant, found by Dr. Wallich in that interesting but not yet half explored country. It has also been found by Mr. W. Griffith in the Burmese empire, growing on trees as it does in Nepal. "Nothing can exceed the flowers of this plant in delicacy of texture or softness of colour, the deep purple of the petals softens away to the margin, and seems to melt as it were into the purer white of the sepals, while the rich crimson and yellow of the lip renders the brilliancy of the other parts still more conspicuous.

4. *Crataegus Douglasii*. The Douglas thorn. "A native of North West America, where it was collected by Mr. Douglas; a hardy tree, of small size, flowering in May."

5. *Maxillaria cristata*. Crested Maxillaria. A beautiful flowering orchideous plant, a native of Trinidad. From the rich and extensive collection of Mr. Knight, King's Road, Chelsea. "The striping, banding, and painting of the delicate white flowers with rich crimson, produce a very rich and striking effect."

6. *Gardoquia Gilliesii*. The Gillies Gardoquia. "A neat little half-shrubby plant, growing not more than six or eight inches high, flowering from June to September, but requiring a little protection in winter." It belongs to the natural order *Labiaceæ*.

7. *Daubenia aurea*. "A green-house bulb, native of the Cape of Good Hope, from whence it was received by Messrs. Young, of Epsom, under the name of *Massonia lutea*." This plant, though bearing a likeness to the old genus *Massonia*, Dr. Lindley considers a new genus, and named it in compliment to Dr. C. Daubeny, Professor of Botany at Oxford.

SWEET'S BRITISH FLOWER-GARDEN, continued by D. Don, Esq. The November number contains:—

1. *Delphinium cheilanthum*: var. *multiplex*. Double large-lipped larkspur. "This is a double variety of one of the finest species of the genus. It is a most lovely plant, the flowers being equal in size to those of the double variety of *D. grandiflorum*, and of a still richer colour. A mixture of moor-earth and loam will be found to suit it best."

2. *Escallonia pulverulenta*. Powdered Escallonia. A South American upright branched evergreen shrub, rising to the height of six or eight feet, sometimes more. "We know nothing of the constitution of the present species, but we presume it will be found to be quite as hardy as the other species from the same country." This genus gives a title to one of the natural orders, viz. *Escalloneæ*.

3. *Poinciana Gilliesii*. Dr. Gillies's flower-fence. An erect slender branched tree, rising to the height of eight or ten feet, and so far hardy as to have stood for several years, placed near the wall of a stove in the open air in Mr. Knight's nursery, King's-road, Chelsea, where it flowered in July last. It is a native of South America, where it was found by the late Dr. Gillies, and after whom it is named. The *Poinciana pulcherrima* is one of the most beautiful productions of the East Indies, but being much more tender, is much less valuable than the *Gilliesii*, which promises to be an ornament to our flower-gardens. The plant belongs to *Leguminosæ*:

4. *Erodium serotinum*. Late flowering heron's-bill. "A very showy perennial species from Siberia, introduced to our gardens in 1821; but although a plant of easy culture it is rarely met with in collections."

PAXTON'S MAGAZINE OF BOTANY, November, 1835, contains—

1. *Epidendron fragrans*. Sweet scented Epidendrom. This species of orchideæ was introduced from Jamaica by Messrs. Loddiges, of Hackney, several years since. The flowers have but little colour, being of a pale or yellowish white hue, but the scent is exquisite, on which account it has a claim to be in every collection of orchideæ. This plant is an instance of what, is observable in many cases in the vegetable kingdom, viz. that where splendid colours are bestowed fine scent is wanting, and *vice versa*. The gorgeous camellia is scentless, while the colourless mignonette yields the richest odour.

2. *Calceolaria corymbosa*, var. Jupiter. The Jupiter Slipperwort. A fine variety of this interesting genus. It was raised by Messrs. Young, of Epsom, and among the other varieties of the family is a very conspicuous one.

3. *Petunia linearis*. Narrow-leaved Petunia. This species was introduced by Mr. Neill, of Edinburgh, from seeds received direct from Buenos Ayres.

4. *Phlox Drummondii*. Mr. Drummond's Lichnidea. Raised by Mr. Campbell, Curator of the Manchester Botanic Garden, from seeds sent to him from the late Mr. Drummond himself.

Besides the figures and descriptions of the above plants, there are added some very useful remarks on the culture of hardy deciduous and evergreen shrubs; with a selected list of the most beautiful. There are also some very good remarks on the winter management of plant stores, and on the treatment of cage-birds, in a notice of Bechstein's book on that subject.

SMITH'S FLORISTS' MAGAZINE, for November, contains beautifully executed figures of the Marcellus Tulip, with a sketch of a frame and awning for a tulip-bed; the Madame Hardy and Village Maid Roses; Emmeline and Princess Frederica Picotees, and the Achilles Auricula; to all of which very accurate practical directions are given for their propagation and culture.

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## LITERARY NOTICE.

*The Earth: its Physical Condition, and most Remarkable Phenomena.* By Mullinger Higgins, Esq., F.G.S., and Lecturer on Natural Philosophy at Guy's Hospital.

THIS is the second book published under the same title within these last six months. The first was by Mr. Mudie, being one of a series of four volumes to be entitled the Heavens, Earth, Air, and Sea. The plan of the volume before us is very different, as it includes all these, and on this account will be considered as much more convenient. The various matters treated of may be learned from the titles of the chapters, which are as follow:—Chapter 1. The Earth in relation to the Universe. Chap. 2. Celestial appearances. Chap. 3. The Atmosphere and its Phenomena. Chap. 4. Atmospheric Phenomena dependent on the distribution of heat. Chap. 5. Phenomena dependent on the distribution and conditions of light. Chap. 6. Phenomena dependent on the distribution of Electricity. Chap. 7. Phenomena dependent on Terrestrial Magnetism. Chap. 8. Interior of the Earth. Chap. 9. Land and Water. Chap. 10. Superficial Temperature of the Earth.

These ten chapters include all that is known of the different sciences of Astronomy, Meteorology, and Geology, together with all those branches of natural philosophy arising or deducible from these several sciences. The well-known abilities of the author as a lecturer, is a sufficient guarantee that his facts are drawn from the purest sources, the authorities which he has quoted being of the first rank, and his own lucubrations and critical remarks are of themselves most valuable. He deals only with facts, and with a strong predilection to instruct rather than to please—to convince the judgments, rather than to dazzle the perceptions, of his readers. As an epitome of the various branches of natural philosophy freed from all the encumbrance of system, we know of no book better adapted for the use of schools, or at least as an excellent volume for every juvenile seminary.

## CALENDARIAL MEMORANDA FOR DECEMBER.

**KITCHEN GARDEN.**—Protecting the growing and stored crops from the severity of the weather, is a daily and principal task in this department at this dead season of the year: it is also a month of preparation for the execution of much business to be done hereafter. Manuring, trenching, or double-digging vacant pieces of ground; collecting and turning composts; preparing dung for hotbeds, &c., are all the ordinary employments of the month.

*Peas.* If the weather be open, and the soil pretty dry, another sowing of early peas may be put in. This is particularly necessary if the first sowings be cut off, or to succeed them if they be not.

*Beans.* Another sowing of mazagan or early long pods may now be put in; for, though they may not make much progress during the shortest days, they will flower and produce pods earlier than if sown a month later. Be careful to guard both beans and peas against the depredations of mice or other pests.

**ICE-HOUSE.**—When frost sets in, and the ice upon the ponds has become of sufficient thickness, preparations must be made for filling the house. This business commences by clearing the house of all the old damp straw with which the last year's ice was covered, sweeping out the passages, and carting away all the leaves, straw, and other litter from about the entrance.

A sufficient quantity of trussed wheat straw must be brought, and laid near the entrance, but not directly before it. The trusses, which usually weigh about forty pounds each, should be halved, that is, divided into two, and bound separately. This makes the straw more manageable for lining the walls of the house, and for covering the ice when the house is full, and for filling the passage within the outer door.

A dozen or two of heavy clubs or beaters, having crutch-like heads, or bent like the segment of a circle, should also be provided for breaking and pounding the ice, together with shovels, iron-headed rakes, and dung-draws for drawing the ice off the water, and loading it into carts.

Filling the ice-house should be done, if possible, in one day. All the labourers about the place should be employed, with three or four pairs of horses, and large carts, according to the distance of the pond from the ice-house.

The house-gang of men consists of two careful hands in the house, to level and pack the ice as fast as it is thrown to them, first laying a foundation of straw on the bottom, and a rank of trusses round against the wall, surmounted by other ranks of trusses, as the filling proceeds. Two other men are stationed in the passage, passing the broken ice along with shovels; another, on the outside of the door, throws it from the breakers into the passage, as fast as the latter can break it up. In the meantime, cart follows cart from the field party, shooting their loads into or near the enclosed area, where it is broken on its way into the house. Thus the work proceeds until the house is full, and with great expedition, if the gangs be equally balanced, and the labour equally apportioned. Much depends on the exertions of the housemen; they have to pack the straw firmly round the sides, so that no part of the ice touch the brick-work; they have also to see (as they work by candle-light) that the body of ice be firmly and equally trodden, and closely rammed.

When the house is full, the space above the ice is filled with trusses of straw, as well as the passage, all the way to the outer door, which is immediately shut and locked.

It is to be observed that the more the ice is beaten and pounded, so as to resemble snow, the less air is contained in the mass, and the sooner and harder it congeals into a solid body;—so solid, indeed, that it requires to be broken up by mattocks, when wanted for use. Loose ice, even in the best-constructed house, keeps but a very short time, because the air enclosed with it acts as a solvent, and quickly melts the pieces.

The ice-houses built in this country are all on the same plan, and seem to be imitations of the ice-wells of Spain and Italy. They are an egg-shaped cavity—the small end downwards; the walls are of stone or brick-work, from fourteen to eighteen inches thick. Sometimes the walls are double, that is, built with a vacuity of three or four inches between, to act as a non-conductor of heat from the surrounding earth. In either case, the wall is backed by a coating of rammed clay, to prevent the soakage of land-springs. The size is always according to the demand of the family: ten or eleven feet wide, and fourteen to sixteen feet deep, is a middling size, crowned with a flattish arch. The north side of a bank or hill, or a place deeply shaded by trees, are situations usually chosen, but always with reference to a circumstance indispensable to the efficacy of an ice-house, viz. a lower dip or stratum of absorbent earth to receive the drainage from the ice. For this purpose a little well or cess-pool, grated over, is



built at the bottom of the house, whence a drain is laid to carry away the water to some lower level. This drain has a water-trap formed in some part of it, to prevent the ascent of air to the ice.

The entrance to the house is a brick-built arched passage, about five feet high, opening into the house a little below the arched crown, where an inner door is placed. The length of the passage is more or less, according to the declivity of the ground; but this, as well as the crown of the house itself, is covered with earth three or four feet thick, and usually planted with evergreen shrubs.

Immediately in front of the outer door there is an enclosed area, fifteen feet square, walled round, and paved level with the floor of the passage. This is for breaking the ice in; and in order that the carts may draw up close, to shoot the ice into the area, the surface on the outside is raised nearly level with the walls.

Such is a brief account of the construction and manner of filling ice-houses; and it may be remarked of them that, though they preserve the ice pretty well, they are very inconvenient. When a couple of pailfuls of ice are wanted, nearly the whole of the straw in the passage must be removed, especially if the inner door be on hinges; and, after midsummer, a ladder must be used to get down to the ice, which then stands like a frustrum of a cone in the centre of the building. On the top of this the man must stand to get the ice, and must be cautious lest he slip off among the loose straw round between the ice and wall, which, if he did, he would have some difficulty to extricate himself from. When he has got what ice he wants, the whole must be closed again; and this labour must be repeated every morning, perhaps, for months together.

Having seen ice-houses in many situations, and having often felt the inconvenience of their construction, we have long entertained the idea that they might be considerably improved, without much, if any, additional expense in building. We have always thought them too deep, not only from the difficulty of getting out the ice, but because the deeper the excavation, the more liable is it to be affected by land-springs, as well as the heat of the earth, which always increases the deeper we descend. This is the more probable, inasmuch as ice-houses formed on the surface, yea, even on an elevated surface, if sufficiently defended from the influence of air, preserve ice as well as, if not better than, the subterranean houses.

We would, therefore, propose the following plan of an ice-house, which we think would combine the facilities of management with its efficiency as an ice-store. Choose the north side of a hill or wood, as

near to the mansion-house as possible. If no such circumstances offer, then fix on some dry spot, where a clump of trees and shrubs would be no eye-sore. Here, instead of digging a deep well, clear away the surface-spit of loose earth, till a firm subsoil is found, and on this the building is to be erected. The size must be in proportion to the demands of the family. If one pail of ice be wanted daily for six months, the house should be capacious enough to hold one hundred and fifty cubic feet of ice, or from fifteen to eighteen large cart loads beaten fine. A parallelogram ten feet wide and fifteen in length, with side walls four feet high, and arched over, will hold this quantity, as well as a lining of straw under, at the sides, and over the entire body of ice when deposited. The ends of this arch are built up, except the doorway, five feet by four, at the outer end. An arched passage, eight feet in length, and four feet wide, connects the inner with the outer door. The walls and arches should be all fourteen-inch work, all carefully and well bedded in strong stone-lime mortar. The floors of the main vault and passage are paved smoothly, and laid with a descent outwards, so that the drainage may flow into a dip at one side of the inner door, where an opening through the wall of the passage will permit its escape into a cesspool on the outside. In front of the door, a paved area, twelve or fifteen feet square, surrounded by low walls, should be added to complete the building.

The structure only requires now to be protected from the heat of the sun, the soaking in of rain water, or the entrance of air. A coat of fine clay is laid over all the brickwork, and then covered with a mound of earth, the thicker the better, and which is afterward planted with evergreen shrubs, and surrounded by trees.

Some practical men think that, instead of earth, a very thick coat of dry litter and thatch repels air and heat much more effectually than any covering of earth, and in which case the house only requires the shade of trees.

When the north brow of a hill can be taken advantage of, a cave dug *horizontally* into the bank (and the farther the better) to admit the brickwork, may be made an excellent ice-house; because the ice, being deposited so far from any atmospheric influence, will remain long unmelted; and the floor from the front area inwards to the further end being on a gently inclined plane, makes both the getting in and getting out the ice a very easy affair.

Snow may be used when ice cannot be had; and if well trodden together and watered a little, if dry and powdery, it soon becomes a solid mass of ice. Some add sprinklings of salt along with the ice when

put into the house with the view of preserving it; but this is an erroneous notion, unless it be supposed that, by the abstraction of the latent heat from some of the ice dissolved by the salt, a greater degree of cold is produced to consolidate the remainder. But salt is altogether unnecessary; if ice do not keep without, it cannot be preserved with such an application. Confectioners use salt to dissolve not preserve the ice, because a much more intense degree of cold is generated during the solution than if the nodules of ice remained undissolved.

The inner door of the house should not be on hinges, but formed in two or three parts, moveable in grooves in the side posts. This saves the trouble of removing all the straw in the passage every time the house is entered; as by removing a part of the straw, and the upper part of the inner door, a man may squeeze himself in with his shovel, lantern, and pail, without disturbing much of the straw in the passage.

*Mushrooms.* The bed will require to be frequently examined whether bearing or not; more or less covering may be needed according to the temperature, as indicated by the thermometer.

*Tender Plants in Frames.* Cauliflower, lettuce, endive, &c., in frames, should be attended to. Air should be given on all favourable occasions, and be kept free from decayed leaves, weeds, and damps. A covering of mats may also be often necessary. Asparagus, sea-kale, and rhubarb, intended to be taken up for forcing, should be covered with litter, lest they get imprisoned by frost when wanted to be taken up.

**FRUIT GARDEN.**—Pruning and training or transplanting in mild weather may still be executed; and where top-dressings of either rotten dung or compost are required, now is a good time to spread them over the roots.

**FLOWER GARDEN.**—There is but little to do in the flower garden at this season. If very hard frost sets in, some of the beds planted in the two former months, may require the occasional covering of mats, and every thing liable to be hurt by frost should have some sort of protection. A few more pots of bulbous and tuberous flowers may be planted to go into the house to succeed those planted in October. Greenhouse plants should have all the air that can be given with safety. Some of the plants that are growing freely will require water once or twice a week; but the generality but seldom. If the house become damp for want of sufficient ventilation, the flue should be heated, and plenty of mild air admitted to dry it; and it is hardly necessary to add, that if frost prevail a little fire will be wanted every night, but never more than is just sufficient to repel the frosty air.

## REMARKS ON THE WEATHER.

ALTHOUGH there have been several nights in the early part of the month in which we have experienced pretty keen frost and rain alternately, there has not been so much of either as to kill what was tender, or check materially what is growing. Turnips sown since the commencement of the rains are still going on, though now but slowly; nor is it likely they will ever arrive at a great size. Celery has lately become very bulky, and will generally be very fine. The different kinds of the *Brassicae* are also attaining a good size, though the common sorts, such as savoy, coleworts, &c., which should now be plentifully in season, are both scarce and, consequently, very dear in the market.

Accounts from the northern counties speak of hills covered with snow, and other signs of winter: a little has fallen to the eastward of London, but quickly disappeared. The autumn, therefore, continues very much like what we have had in the last and other previous years, namely, changeable, but generally open and mild. If the same kind of weather continue through December, clearer skies and keener air may be expected with the lengthening days, and then the vigilance of the cultivator will be called into action, and the necessity of fire and dung heat, and thick coverings for all perishable plants, will be found indispensable. In such seasons, watching the face of the sky is a very necessary part of the gardener's business, the study of meteorology being one of the auxiliaries of his success. Extreme caution against sudden changes of the weather is but seldom repented of; and trusting to the mild aspect of an evening is often bitterly lamented on the return of the next day.

On the evening of the 18th, and, if we mistake not, on two or three cloudy evenings before, we had a beautiful exhibition of the *Aurora Borealis*, or northern lights, which put almost all the fire-engines in London in motion. A luminous arch, subtending twenty or thirty degrees of the northern horizon, and rising in the centre about fifteen degrees above the latter, was strikingly visible for several hours on the above-stated evening. Such appearances (attributed to the presence of an electric fluid) are said to succeed "a long continuance of dry weather." It may be so; but in the present case the effect has not followed closely after the assigned cause. But it has also been affirmed that these appearances portend fine or dry weather; and, if that which we now enjoy be continued, we shall be rather inclined to put faith in the latter prediction. It is somewhat remarkable, that the Rev. W. B. Clarke, a correspondent of London's Magazine of Natural History, had urged upon the readers of that work to "be upon the watch" for such appearances on the 12th or 13th of November, as about that time, sooner or later, he expected a display of such meteors.

## LIST OF ILLUSTRATIONS.

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PLAN AND ELEVATION OF A NEW GREEN-HOUSE AT CHATSWORTH.

PLANS AND SECTIONS OF MELON AND PINE PITS.

FIGURE OF AN ANCIENT OAK.

FIGURE OF PASSIFLORA KERMESINA.

PLAN OF THE GEOMETRICAL FLOWER GARDEN AT CHATSWORTH.

ILLUSTRATIONS OF TREDGOLD'S HOT WATER APPARATUS.

CUTS OF MR. SAUL'S MANNER OF TRAINING PEAR TREES.

FIGURES OF ORNAMENTAL ARBOURS.

FIGURE OF A RUSTIC WINDOW.

ILLUSTRATIONS OF LINNÆAN BOTANY.

FIGURE OF A DECIDUOUS SHOOT OF BLACK POPLAR.

ILLUSTRATIONS OF LINNÆAN BOTANY.

FIGURES OF THE BANYAN TREE OF INDIA.

FIGURE OF ENTRANCE GATE TO FAIRFAX HALL.

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|                                                                  | Mr. A. Walker     |

# A LIST OF NEW AND RARE PLANTS

NOTICED IN VOL. IV.

*Abutilon pulchellum*  
*Acacia prensans*  
*Acanthophippium bicolor*  
*Anagallis monelli*  
*Anegosanthus Manglesii*  
*Angræcum micranthum*  
*Angræcum distichum*  
*Anthyllis Webbiana*  
*Arbutus procera*  
*Arctostaphylos tomentosa*  
*Azalea Indica: var Smithii*  
*Azalea marginata (hybrid)*  
*Azara dentata*

*Bellium crassifolium*  
*Berberis dealbata*  
*Bletia Shepherdii*  
*Brassia lanceolata*  
*Brugmansia sanguinea*

*Calceolaria corymbosa*  
*Calotropis procera*  
*Camellia Japonica Cunninghamia, (hy.)*  
*Camellia Japonica Fordii*  
*Campanula garganica*  
*Catasetum purum*  
*Cereus triangularis*  
*Chilodia scutellarioides*  
*Chironia peduncularis*  
*Chorizema Henchmannii*  
*Cleanthus puniceus*  
*Colletia horrida*  
*Collinsia bicolor*  
*Coryanthes maculata*  
*Cratægus Douglasii*  
*Cratægus Mexicana*

*Daubénia aurea*  
*Delphinium cheilanthum*

*Dendrobium cupreum*  
*Dendrobium fimbriatum*  
*Dianthus Carthusianorum*  
*Dracena terminalis*  
*Dyckia rariflora*

*Edwardsia Chilensis*  
*Empetrum rubrum*  
*Epacris impressa*  
*Epidendron fragrans*  
*Eriogonum compositum*  
*Erithronium grandiflorum*  
*Erodium serotinum*  
*Escallonia pulverulenta*  
*Eschscholzia crocea*  
*Eupatorium glandulosum*  
*Euphoria Longan*  
*Eutoca divaricata*  
*Eutoca viscida*

*Fernandesia acuta*  
*Fuchsia discolor*

*Galardia bicolor*  
 ——— *picta*  
*Gardoquia Gilliesii*  
*Gardoquia Hookeri*  
*Gesnera allagophylla*  
*Genista amxantica*  
*Gesnera faucialis*  
*Gillia coronopifolia*  
*Gladiolus natalensis*  
*Gladiolus pudibundus*  
*Goldfussia anisophylla*  
*Govenia superba*

*Habenaria gigantea*

*Ipomæa Aitoni*

**Kennedyia Marryattæ****Lalage ornata****Lasthinia glabrata****Lælia anceps****Leptosiphon densiflorus****Linum flavum****Lenum monogynum****Maxillaria cristata****Maxillaria crocea****Maxillaria densa****Maxillaria Harrisoniæ grandiflorum****Maxillaria picta****Mesembryanthemum rubrocinctum****Microtis parviflora****———— media****Mimulus luteus ; var. variegatus****Monacanthus viridi****Morisia hypogæa****Mutissia latifolia****Myanthus barbatus****Narcissus maximus****Neottia calcarata****Nierembergia calycina****———— Atkinsiana****Nolana atriplicifolia****Oncidium Lemonianum****Oncidium pulchellum****Oncidium triquetrum****Opuntia monacantha****Orobus hirsutus****Passiflora kermesina****Pavia carnea****Pentstemon staticifolius****Petunia linearis****Petunia nyctaginiflora violacea****Phlox Drummondii****Phlox cordata grandiflora****Phlox stolonifera, var. crassi****Pholidota imbricata****Pleurothallis Grobyi****Poinciana Gilliesii****Pœonia Moutan, var. lacera****Pœonia Moutan, var. punicea****Primula ciliata****Prunus japonica****Psoralea macrostachya****Rhinopetalum Karolini****Rhodanthe Manglesii****Rhodochiton volubile****Rhododendron arboreum (nov. spec.)****Rhododendron flavum ; var. ardens****Rhododendron Indicum, var. specios.****Rhododendron venustum****Rhododendron nudiflorum : var. excels.****Ruellia elegans****Russelia juncea****Saxifraga ligulata****Schizanthus pinnatus humilis****Stanhopea oculata****Stapelia gussoneana****Symphytum Caucasicum****Symphytum officinale ; var. Bohemii****Tritoma Burchellii****Tropœolum majus venustum****Tropœolum tricolor****Tupa blanda****Vanda teres****Verbena multifida****Viola cucullata****Zephyranthes Spofforthia****Zygopetalum Mackaii**



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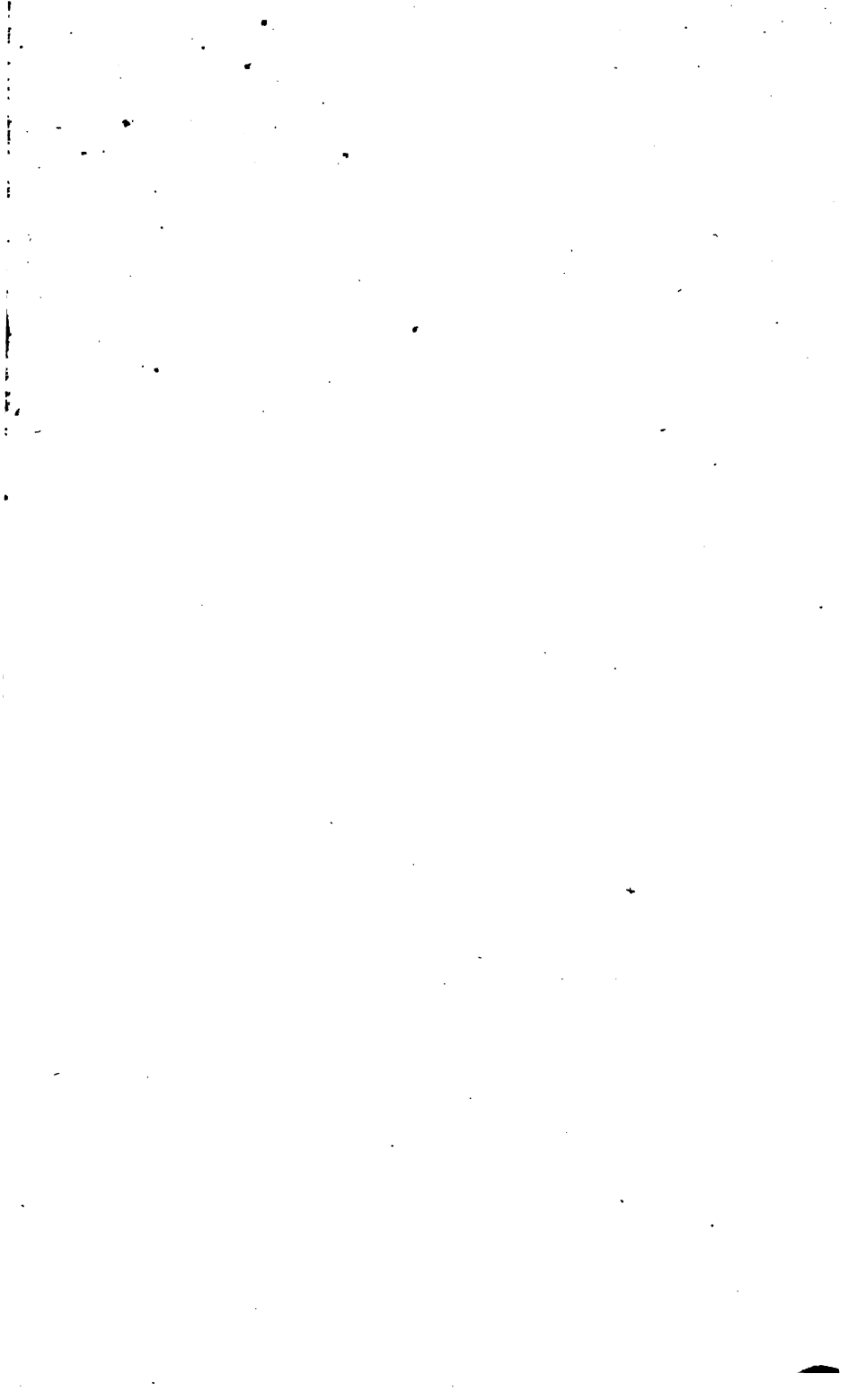
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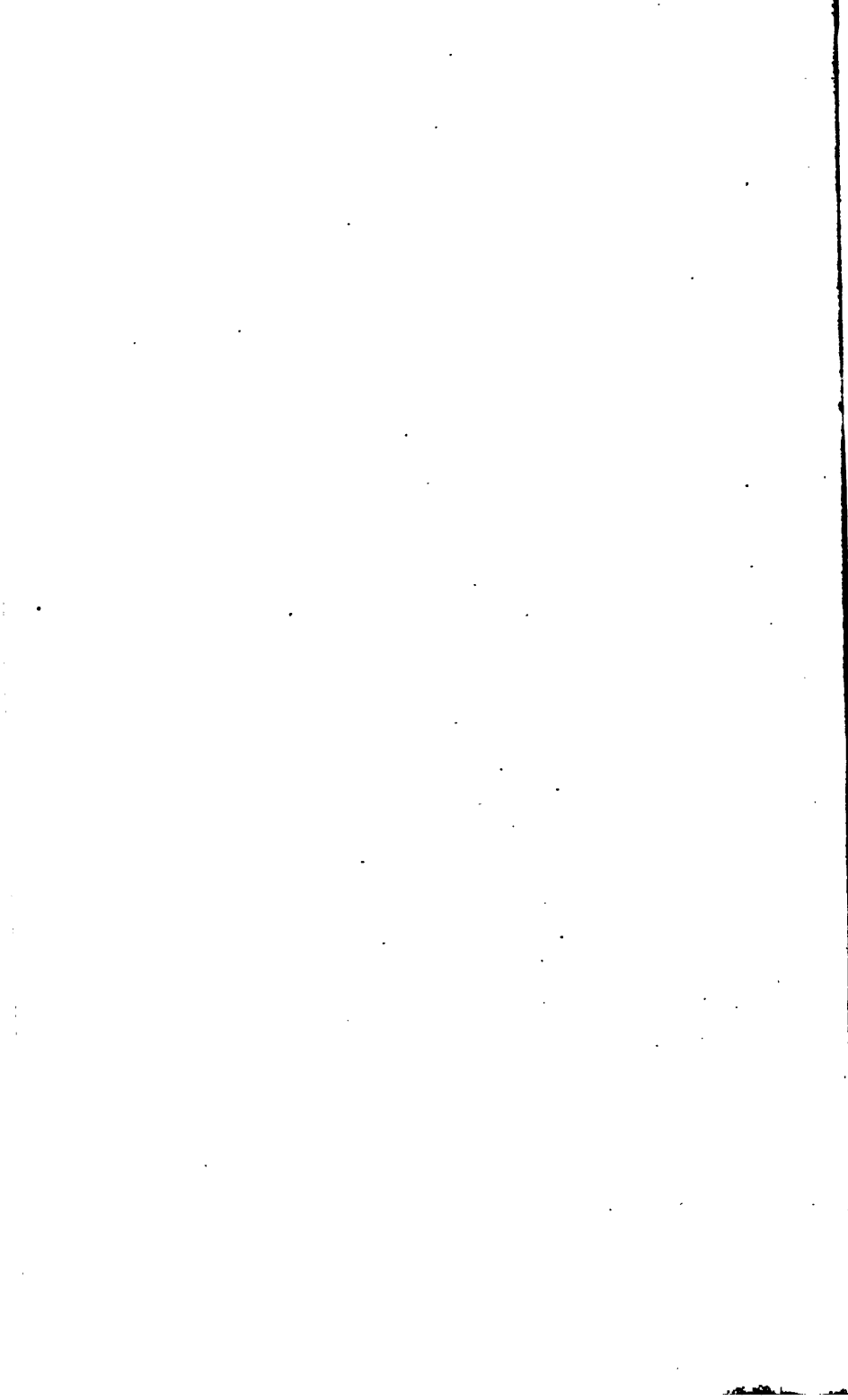
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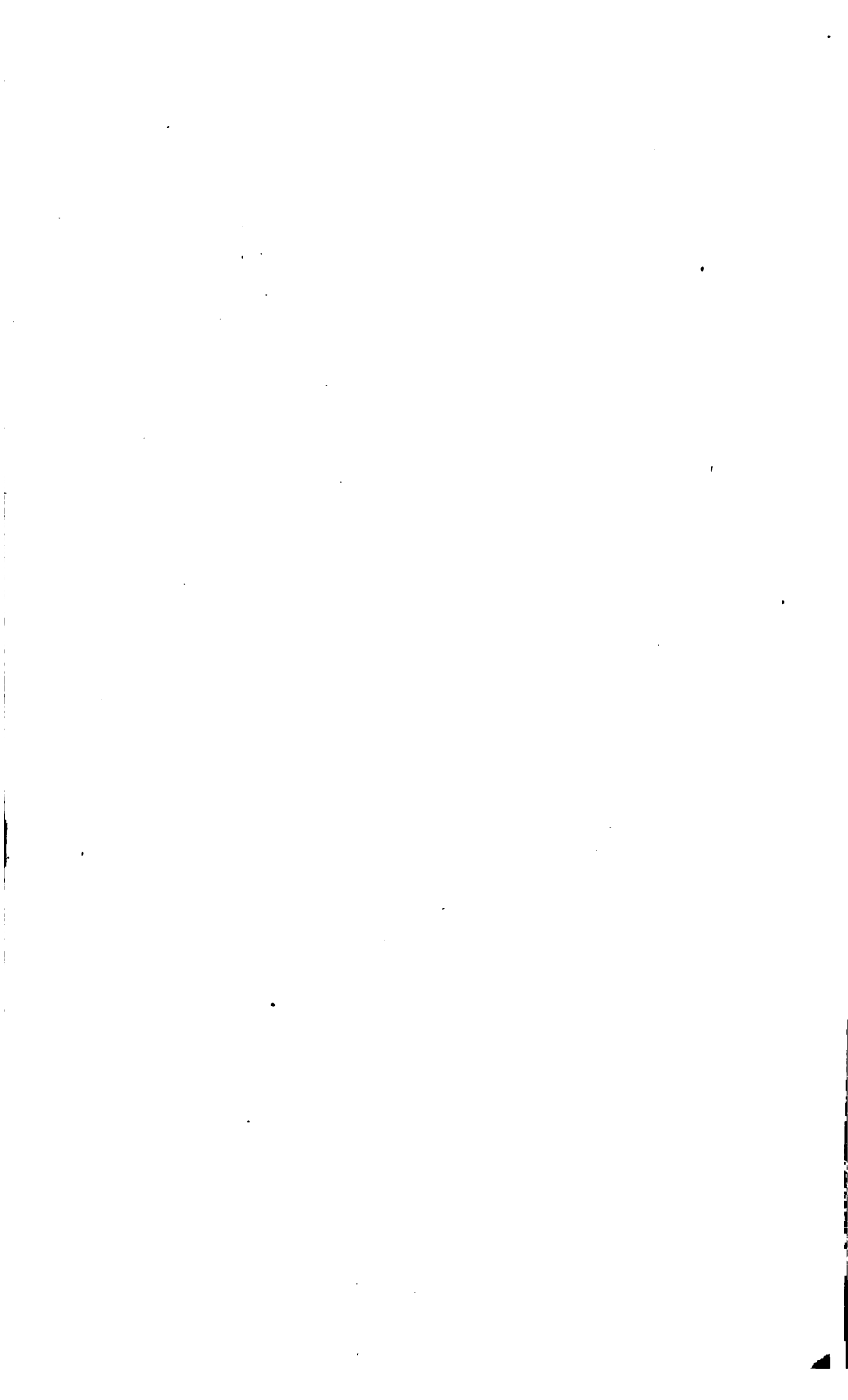
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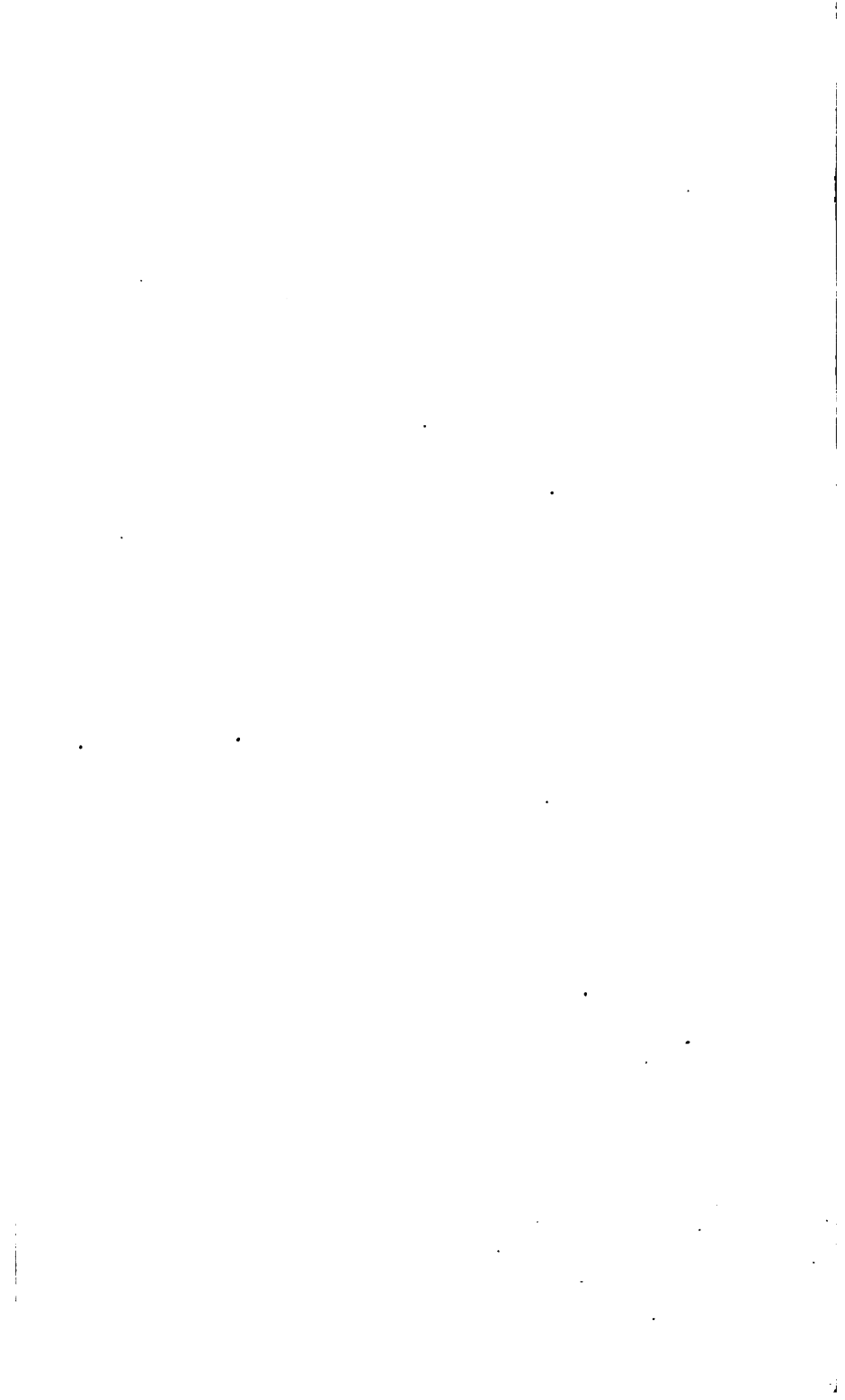
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